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The Role of Individual Ability and Structural Embeddedness on Entrepreneurial Success

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I. Abstract

In the present thesis I analyse the roles of individual ability and structural embeddedness on entrepreneurial success. The results retrieved from a matched employer-employee longitudinal data set show prior worker productivities and environmental embeddedness to have a persistent positive impact on the size and growth rates of new firms. What is more, embeddedness facilitates the impact of ability on start-up performance with outsiders of comparable abilities starting smaller and slower growing firms. Those in higher ability categories are more likely to transfer and also, albeit to a lesser extent, close their ventures, an effect attributed to the higher opportunity costs associated with the group. Firms managed by embedded agents enjoy longer longevities and have better chances of finding a new owner after the departure of the previous one. Finally, higher ability types show evidence of specialisation in serial entrepreneurship.

(Keywords: entrepreneurship; individual ability; structural embeddedness; division of labour)

"For he is Odysseus, a man of great craft, son of Laertes born in rugged Ithaca, and excels in all manner of tactics and subtle mētis"

Homer, Book III of the Iliad

II. Introduction

Mētis is an Ancient Greek word that denotes a quality of skill or cunning. It was the defining trait of Odysseus, a character introduced by Homer in the Iliad and the hero of the later Odyssey. Odysseus is a man of cunning who will take all necessary measures to guarantee the success of his endeavours. By deceiving the Trojan with the gift of a giant wooden horse, Odysseus was able to sneak into the citadel and overcome a larger force than his own. Odysseus used whatever scarce resources he had at his disposal to great effect, often by spotting an opportunity where others saw but a deadlock. Whilst the contemporary reader may be estranged by such a take on heroism, the conception of *mētis* was in fact deeply rooted in Classic Greek tradition. Alexander the Great, for example, is credited with solving the Gordian knot riddle by simply cutting it with his sword. Greek heroes were not necessarily the bravest or the wisest. What they achieved however, was unique and that was what distinguished them from their peers.

The previous analogy offers a brief description of one of the traits most commonly associated with the figure of the entrepreneur. The notion that entrepreneurs play unique role in an economy can be traced back to Cantillon (1755) and has over time received attention from scholars in various fields. Whilst contributions inspired mainly by a disequilibrium approach to entrepreneurship emphasised the importance of the ability to discover and create business opportunities (Schumpeter, 1934; Schultz, 1975; Casson, 1982; Shane and Venkataraman, 2000; Sarasvathy, 2001), other studies focused on how

differences in ability affected occupational choices leading to entrepreneurship and the resulting individual and firm outcomes (Lucas, 1978; Casson, 1982; Amit et al., 1995; Hamilton, 2000)[1]. Holmes and Schmitz (1990) showed that individuals with greater levels of ability to identify opportunities had a comparative advantage in specialising in serial entrepreneurship whilst Gimeno et al. (1997) explained the subsistence of underperforming firms with the relatively lack of employment alternatives for their owners.

However, the effect of ability on firm outcomes can also be conditioned by the existing degree of embeddedness between the entrepreneur and the business environment. Firm internationalisation literature has long identified a liability of foreignness effect (Zaheer, 1995) that hampers the performance of otherwise competitive newcomers into a market. More recent contributions (Johanson and Vahlne, 2009) have generalised this finding to all outsiders to a given environment and Figueiredo et al. (2002) found a strong preference for entrepreneurs to start a new firm in areas where they had previously worked.

In this thesis I assess how ability and embeddedness affect the outcomes of new ventures and of their founders. Using a longitudinal data set with detailed information of both individual and firm characteristics, I explore how past productivities of individuals as wage-earners impact upon entrepreneurial outcomes and decisions. The distances between geographic locations of the workplaces of those individuals before and after the beginning of their first self-employment spell serve as a proxy for embeddedness and also constitute a determinant of firm performance, longevity, and transfer.

Results confirm the presence of a lasting interconnection between past productivities and the performance of subsequently created firms, with ventures created by superior

[1] Whilst acknowledging the literature based on the risk preferences of the entrepreneur developed from the early insights of Knight (1929) and the contributions of Khilstrom and Laffont (1979), I will be centring the present discussion on the question of entrepreneurial ability.

ability entrepreneurs being larger and experiencing stronger rates of growth. Firms started by embedded, local actors perform better than those started by outsiders, although the very best amongst outsiders outperform all other groups. Better ability improves the chances of firm transferring to another businessperson whilst increasing, albeit to a lesser extent, the probability of closure. A substantial share of those exiting a venture by transfer will later re-enter entrepreneurship with the starting of a new business. This contrasts with the trend of those who exited a venture via closure, as the latter group is more likely to return to paid-employment. Those with highest levels of ability are the most likely to re-enter by start-up.

The present thesis is organised as follows. The Survey chapter offers an overview of the literatures on entrepreneurial ability and structural embeddedness that are subsequently developed into a set of testable propositions in the Hypotheses chapter. The Data and Methods section details the characteristics of the sources employed, an exploratory analysis focused on the variables of interest, and the exposition of the chosen methodologies. Model results and discussion are presented and discussed on chapter VI. The work is concluded with some final remarks on the findings and their implications for future research.

III. Survey of the Literature

A. *Entrepreneurial Ability*

The Role of the Entrepreneur.—There is a common sense in which chief executive officers of large corporations exercise a good deal of economic power. This coordinative power, or ability, derives from the influence their decisions exert on the productivity of large numbers of others in the organisation as a whole (Rosen, 1982). For the purposes the present thesis the set of skills used by the entrepreneur to influence firm outcomes will be denoted as entrepreneurial ability. In some specific occasions other terms—such as managerial talent, individual ability, economic power or capabilities—will be used interchangeably with entrepreneurial ability. This is done in order to accommodate for the different language employed in the literature.

In no other business context are the repercussions of the actions of one individual as evident as in the entrepreneurial venture. Compared to established organisations, a new firm gives the entrepreneur a much greater degree of autonomy, offering a blank slate for the shaping of new competences and routines. Baumol saw the entrepreneur as "the apex of the hierarchy that determines the behaviour of the firm" (Baumol, 1968: p.64). The image is revealing of the impact attributed to the actions of a single person on a firm and facilitates the introduction of the abstraction of entrepreneurial ability. Entrepreneurial ventures provide researchers with a tabula rasa for the study of how managerial actions shape and affect the fate or organisations. Initial conditions—including those which can be directly attributable to the entrepreneur—produce long-lasting effects on the performance and longevity of new firms (Geroski et al., 2010) by imprinting routines and establishing path-dependencies (Baron et al. 1999).

A second domain in which the influence of the entrepreneur is evident is the market in itself. Entrepreneurial activity plays a pivoting role in the supply side of a market by identifying opportunities and fulfilling them (Schultz, 1975). The function of the entrepreneur—as Cantillon noted over 250 years ago— is to anticipate the combination of productive resources that will generate goods and services that are sought after in the market place. This ability differentiates entrepreneurs from the remainder of the workforce in both actions and cognitions (Alvarez and Barney, 2007). Sarasvathy (2001) attributes the differing character of the entrepreneur to the way these individuals or act upon, or effectuate, business opportunities. Effectuation—in contrast to causation, which selects the necessary means to achieve an effect—refers to the utilisation of presently available resources for the exploitation of emerging contingencies. The uniqueness and the role of the entrepreneur then reside on the ability to seize contingent opportunities and exploit "any and all means at hand to fulfil a plurality of current and future aspirations" (Sarasvathy, 2001: p.262).

The preceding paragraph presented the effectuation of opportunities to create businesses as a defining function of the entrepreneur. These opportunities can be seen as stemming internally or externally to the entrepreneur. In the case of the former, opportunities are crafted by an entrepreneur who starts a business by destabilising an pre-existing market equilibrium in a process of creative destruction à la Schumpeter. For the latter, the entrepreneur possesses a higher degree of environmental alertness that allows for the recognition and exploitation of opportunities that are repeatedly and exogenously emerge (Kirzner, 1979; Shane and Venkataraman, 2000). In any event, the entrepreneur is perceived as a dynamic actor in the environment and his creative role as resource coordinator recognised as distinct from that of the manager of an established firm.

Disequilibria and Opportunities.—In an early contribution to the study of entrepreneurship Baumol (1968) noticed the apparent paradox resulting from the absence of the entrepreneur in the mainstream expectational equilibrium approach to economic theory. The theoretical firm was therefore *entrepreneur-less*—an omission which, as the author commented, could only be compared to a play of Hamlet where the role for the Prince of Denmark was unfulfilled. Theatrical considerations aside, Baumol proceeded by asserting the importance of entrepreneurial ability in dealing with economic phenomena. Schultz (1975) further supplemented Baumol's critique by examining the notion of continual disequilibria as the primordial apparatus of economic development. Disequilibria created by exogenous shocks lead to the appearance of new business opportunities. Technological progress, demographic shifts and variations in consumer preferences exemplified the type of disequilibria and therefore opportunities that continuously and autonomously emerge (Holmes and Schmitz, 1990).

Entrepreneurship is the process by which "opportunities to bring into existence 'future' goods and services are discovered, created, and exploited" (Venkataraman 1997, p. 120). In a world where new business opportunities are constantly spawning, entrepreneurs become the agents who deal with, and mitigate, disequilibria by correctly anticipating market demand. The ability to do so is a scarce resource heterogeneously distributed in the population and which could be aggregated into a "supply curve of entrepreneurial capacity" (Becker, 1971: pp.122-123). The information necessary to recognise a potential opportunity is not widely available to all agents because of the specialisation of information in society (Hayek, 1945). Ability then consists of a set of skills which enable the identification and exploitation of rising business opportunities and hence is a valuable

resource for individuals working in self- but also in paid-employment (Casson, 1982; Shane and Venkataraman, 2000).

Ability may be innate to a person but also expanded over time by investing in education and in the development of work experience. As a consequence of the benefits originating from the division of labour, individuals will have an incentive to specialise in different tasks and trade with each other (Rosen, 1983). The specialisation into different occupations gave rise to the heterogeneity in the ability to perform different tasks, including those associated with entrepreneurship. In his classic model of occupational choice, Lucas (1978) asserted that individuals differed in terms of ability and were able to seamlessly transition from workers to entrepreneurs. Implicit to Lucas' argument was the assumption that worker and entrepreneurial abilities were identical. Under various simplifying assumptions, he showed that as economies accumulated capital, the least able individuals were likely to revert from entrepreneurship to paid employment. That is, over time average firm size expanded with small-scale entrepreneurs increasingly replaced by larger organisations. As bigger firms needed more workers, demand for labour was bound to surge, making paid-employment an increasingly enticing option for current entrepreneurs. Smaller firms were then more likely to exit the market, not because of their lack of quality but rather by the increasingly greater opportunity cost put before the entrepreneur of these firms. The distinction between voluntary exits motivated by the increase in the demand for labour of the larger organisations and the exit associated with the failure of a business model has been the subject of subsequent research in entrepreneurship by Headd (2003), Bates (2005), and Balcaen et al. (2012).

Opportunity Costs.—As previously discussed, opportunity costs serve as a major driver in occupational choice, affecting not only the longevity, but also the ownership and management, of entrepreneurial ventures (Lucas, 1978; Holmes and Schmitz, 1990). Depending on the threshold of performance, entrepreneurs decide on maintaining or discontinuing of a business. This implies, as suggested by Gimeno et al. (1997), that firm survival is not strictly a function of economic performance, but rather of performance relative to a firm-specific threshold. Comparable firms with similar economic performance may hence experience opposite fates, as entrepreneurs with distinct levels of ability will differ in the compensations required to maintain the firm.

Holmes and Schmitz further explored the issue of opportunity cost by focusing on the circumstances in which firms were transferred between businesspeople of different levels of entrepreneurial ability. Drawing from a Schultzian model of an economy in constant disequilibrium, the authors investigated the circumstances under which entrepreneurs decide either to continue operating a venture, or to transfer it to a possibly less able entrepreneur in order to release time and resources to explore new opportunities. They showed that the least able types who remain in self-employment will only manage existing firms, whilst the most able individuals will instead specialise in setting-up new businesses. Individuals with intermediate ability optimally either manage the businesses they started, or replace them with higher quality businesses purchased from the higher ability entrepreneurs.

One important novelty of the Holmes and Schmitz model is the understanding of how opportunity cost affects the individual decision of the entrepreneur prior to determining the fate of the firm. By distinguishing between the exit of the entrepreneur and the closure of the business the authors recognised that these firms may be retain a degree of

economic value that generated demand by other individuals. In fact, individuals may specialise in the initial stages of venture creation and development with the specific intent of later on cashing-out on the founded business (Arora and Nandkumar, 2011). By contrast, some of the firms that remain in operation may even exhibit performance levels below those of the discontinuing ventures. The reason for such entrepreneurs to be stuck in a self-employment limbo is again attributable to the lack of matching outside alternatives.

Socio-Demographic Factors.—Research into the upper echelons of organisations—notably the work of Hambrick and Mason (1984)—also discussed the link between the ability or capabilities of its managers and performance. Drawing from both behavioural conception of the firm which can be traced back to Cyert and March (1963) and an organisational demography school (Pfeffer, 1983), Hambrick and Mason suggest that the observable socio-demographic characteristics of managers could be used as proxies for the more complex psychological dimensions of their personalities. Specifically, the authors synthesised a set of 21 predictions linking a number of socio-demographic individual attributes to organisational outcomes. The authors saw these criteria as representative of how different managerial capabilities determined organisational outcomes such as structure, strategic choices, or performance. The diversity in the distribution of socio-demographic characteristics amongst team members and its consequences on managerial interactions and consequent firm outcomes comprised another important dimension of the above reflection.

Further research seeking the validation and the subsequent development of the original propositions led to the emergence of series of contributions to the topic of management team characteristics in new and in existing firms. Focusing on demographic var-

iables of the managerial team—namely tenure, schooling, and functional background — authors studied how its combinations and distributions in managerial teams shaped strategic corporate change (Wiersema and Bantel, 1992), competitive moves (Hambrick et al., 1996), and ultimately firm performance (Murray, 1989). In a recent review of the literature covering over twenty years of research in upper echelons characteristics Nielsen (2010) noted that, in spite of its popularity, attempts to investigate links between individual attributes of team members and functional outcomes still produced inconsistent findings. Explanations for the inconsistencies obtained in the results range from methodological differences to the limitations of the used proxies. In the present thesis demographic measures of ability are seen to be necessary but insufficient determinants of the organisational outcomes in the entrepreneurial context. The text below details the strengths and shortcomings of formal education and professional experience, the two most widespread proxies for ability. I argue for the benefits of complementing these measures with quantifiable performance-based aspects of individual productivity. Special attention is given to the impact of prior productivity as wageworker on the success of later entrepreneurial ventures.

Limitations of Socio-Demographic Factors.—The prevalence of a demography-based apparatus in the analysis of individual capabilities was advanced by Pfeffer (1983) who nonetheless noted that it should not be considered an end in itself. The author asserted that, rather than being taken as a set of causal determinants of organisational outcomes, demographic variables should be interpreted as a manifestation of underlying processes "which are considered difficult to access and measure reliably" (p. 351). Subsequent utilisation of socio-demographic proxies in empirical the fields of entrepreneurship or top

management teams (TMT) was theoretically justified by its adequacy in capturing the unobservable determinants of organisational outcomes.

Observable socio-demographic variables—particularly those concerning to human capital—were also employed in the study of entrepreneurship and new venture performance (see Davidsson and Wiklund, 2001 for an extended review of the subject). Empirical evidence from the literature however, produced results that were less clear than those obtained in TMT studies, highlighting some of the limitations of these criteria. Of particular relevance is the inconclusive nature of the effects of schooling on firm performance. Formal education is a standard proxy for the measurement of human capital and individual ability in the economic and management literatures. Investments in education have been associated with improvements in worker productivity and in innovation via better access to information sources and superior ability to decipher new information (Rosenzweig, 1995). Yet, differing accounts concerning the effects of schooling on firm performance, particularly of new firms, have been reported. Bates (1990) and Gimeno et al. (1997) described a positive impact of higher levels of formal education on business longevity and economic performance, respectively. Stuart and Abetti (1991) and later Cowling (2000), on the other hand, did not find significant impacts of education on the performance of newly created ventures whilst Taylor (1999) was only able to find significant results between qualification and firm longevity for those entrepreneurs who scored highest on academic qualification exams.

The signalling hypothesis provides a possible explanation for the empirical inconsistencies found in the relationship between formal education and firm performance. Signalling uses schooling as a mechanism to correct the informational disequilibria existing between a job applicant and a potential employer (Spence, 1973). The hiring process con-

stitutes an investment made under uncertainty, as most employers will not be sure of the productive capabilities of the prospect employee until taking her under employment. Consequently, job applicants need to credibly convey information about their quality to potential employers. Since salaries depend on the productivity of a worker and education is seen as a proxy for that very same productivity, prospect employees have an incentive to invest in their education in order to obtain higher wages. Juxtaposed to this finding, no information asymmetry is found to exist in self-employment where individuals are aware of their own capabilities. It is then feasible to think that, while useful for assessing productivity as workers, formal education may not to be a reliable predictor for the success of entrepreneurial ventures. What is more, self-selection of relatively high-ability/low-education individuals is expected to occur in entrepreneurship when compared to paid-employment. Since individuals specialise on activities that provide them with comparatively greater levels of output and earnings (Roy, 1951), it is expected that, amongst entrepreneurs, an over-representation of lesser-educated but high-ability individuals is expected to be found. Consistent with this idea are the findings from a recent body of work examining the employee-entrepreneur transition. Carnahan et al. (2012) found that workers with better business ideas often feel underpaid relative to co-workers with similar education and may prefer to exit wage employment and start their own firms. Klepper and Thompson (2010) identified strategic disagreements between employees and management regarding the viability of new projects as a motivator for spin-off formation.

Another standard measure of human capital of workers is professional experience. The acquisition of work experience improves productivity on the execution of firm-specific tasks and—albeit to a lesser extent—of distinct but related activities (Dietz and Bozeman, 2005). Contributions from the literature of corporate spin-offs found that ven-

tures whose founders had in the past worked in other firms operating in the same industry outperformed de novo entrants and dominated the market (Klepper, 2002; Klepper and Sleeper, 2005). The ability to extrapolate from existing experience and redeploy in a new context is an important but insufficient factor of entrepreneurial success. Job experience may contain a high degree of individual heterogeneity, which limits its transposal into an entrepreneurial venture. Organisational routines established and improved upon over time may not be easy to copy and implement in new businesses. The compensation for work experience can vary within industries and even within firms, making the estimation of the influence of experience on entrepreneurial outcomes somewhat equivocal to estimate. Finally, because experience builds up with firm tenure, there is a potential issue with endogeneity that needs to be accounted for (Rosenzweig and Wolpin, 2000).

Entrepreneurial Ability.—The shortcomings of the discussed measures of human capital in the context of entrepreneurial activities prompt the examination of further elements that contribute to the determination of new venture outcomes. Of particular usage are Shultz's (1975) assertions on human capital and market disequilibria. Tackling the question of ability from an individual output perspective, the author noted that "our knowledge of a person's abilities consists of inferences drawn from his performance" (p.828). Moreover, the author reasoned that the existence of economic incentives to reallocate resources sufficed as sorting mechanism for task specialisation according to ability. A conception of ability grounded on the recurring observation of individual outcomes—notably worker performance—over time juxtaposes with the usage of sociodemographic attributes favoured by TMT scholars. In a similar fashion, Winter (2000) offered a description of managerial capabilities as being those that enable the repeated

and reliable performance of an activity. This compares to ad-hoc activities, which do not reflect practiced or patterned behaviours. The ability to consistently sustain a relative performance threshold helps to justify transitions from workers to entrepreneurs by facilitating the comparison of opportunity costs and the forming of expectations regarding new business opportunities outside of the current setting.

Both Schultz and Winter emphasised the continued observation of individual outputs as an essential aspect of ability measurement. Winter's definition of capabilities applied a causal predictability framework that can be transposed to the empirical analysis of the link between ability and the success of entrepreneurial ventures. The persistent character of ability in conjunction with its measurability by individually observable outcomes are what ultimately enables its marking and tracing by the researcher. In order to ensure that the assessment of entrepreneurial ability is not confounded with the business outcomes generated by the entrepreneur, the measurement of that factor needs occur prior to the establishment of the venture. Careful consideration must however, be employed when choosing the defining the appropriate criteria for determining ability.

One of the issues raised by Pfeffer (1983) when proposing the adoption of simple demographic variables to assess managerial capabilities was the difficulty in reliably quantifying an unobservable. While known—or acquired over time via learning—by the individual, ability cannot be easily observed and therefore measured by a researcher. Others however perceive it too. Comparable workers with the identical levels of schooling, equal tenure, and the same functional background may nonetheless exhibit differences in ability, and consequently, in productivity. Since workers with consistently higher productivity rates have a more significant opportunity cost for their current occupation, employers are bound to reward these workers with better salaries in order to entice them

into remaining in the company. Thus, it can be established that differences in ability are not only known to the individual but also recognised by the employer and translated by variations in compensation. What is more, the better-paid workers who leave their jobs in order to pursue the path of entrepreneurship should expect the return on their ability to be higher in their new occupational choice. Implied here is the previously discussed idea of transferability of skills from a job as employee to one as entrepreneur. Again, self-awareness of one's own ability is paramount in the understanding of occupational choice. The decision to voluntarily enter in entrepreneurship can be motivated by a number of factors—ranging from desire for greater independence to the internalisation of the locus of control (Shane et al., 2003)—yet it is always based on the belief of Pareto improvement over the initial state. An a priori expectation of future firm success is hence a necessary condition for choice of entry to occur. The following prospects of success will in turn be tied to the degree to which the ability of an individual allows for the identification and exploitation of business opportunities.

In the light of these arguments it is possible to obtain a quantifiable measure of ability that maintains an exogenous causal link between the entrepreneur and the venture by observing the career of the individual prior to the entry into self-employment. Higher ability individuals will command a wage premium relative to their co-workers. If individual ability is not fully captured by standard wage determinants—such as schooling and experience—then, at least some degree of wage heterogeneity is likely to persist even after controlling for these and other individual- and firm-level variables. We may then obtain a measurable and empirically testable proxy for ability by extracting the systematic difference in individual salaries from other observable factors related to both human capital and other more aggregate dimensions. A more detailed description of the theoreti-

cal methodology used in the estimation of ability is developed in the Methodology section. For now, the analysis proceeds with the introduction of embeddedness and of its relationship to individual ability.

B. Structural Embeddedness

Ability and Embeddedness.—Organisations exist in an economic environment cohabited by other firms. As open systems, they derive essential tangible and intangible resources from entities outside their own boundaries. They also leverage their internal competitive strengths through coordination with other firms (Uzzi, 1996). Thus, the external environment and organisations comprising it are not only unavoidable; they play a prominent role in competitive outcomes (Pfeffer and Salancik, 1978; Baum and Dutton, 1996).

Embeddedness refers to the process by which on-going social relations shape and constrain the economic actions of individuals and organisations (Granovetter, 1985). Embeddedness relates to entrepreneurial ability by defining the network of ties in which individuals interact and information circulates. As access to private information and knowledge sharing are more frequent to those who develop stronger ties, awareness of nascent business opportunities is improved (Ozgen and Baron, 2007). The degree of embeddedness in a network thus defines the boundary condition, or the extent to which, an entrepreneur is able to exert her capabilities. Embeddedness therefore leverages the structure and quality of interpersonal ties in order to facilitate the creation if an exchange system with unique opportunities relative to markets (Granovetter, 1973; Uzzi, 1996). Research in embeddedness points to critical information and learning benefits (Haunschild, 1993; Westphal et al., 2001), as well as relational assets, notably trust and access, that not only enhance the ability of the organisation to procure critical resources (Pfeffer, 1983),

but play an important part in the successful implementation of selected strategies (Geletkanycz and Boyd, 2011).

Traditionally, researchers have categorised embeddedness into four broader categories: cognitive, cultural, structural, and political (Zukin and DiMaggio, 1990). Of these, structural embeddedness is of particular interest in the context of the present analysis as it emphasises the contextualisation of the dynamic patterns of interpersonal relations and its effects on economic outcomes. Structurally embedded actors benefit from a central strategic position in a network by virtue of being involved in many significant ties (Wasserman, 1994). Differences in the degree to which network agents are structurally embedded lead to asymmetries in the access to informational and social capital resources controlled by firms (Gnyawali and Madhavan, 2001). Benefiting from their centrality, structurally embedded actors are able to circumvent costly market mechanisms which outsiders have to resort to. For example, a more central position in a vertical network of cooperative relations, say with suppliers, translates into a resource advantage and, thence, into a potential competitive advantage. Moreover, the network serves as a search and monitoring mechanism for each the strategies and actions of others, increasing, in the process, the cognitive salience of some competitors relative to others.

Transaction and Reputation Costs.—The extent to which information can be disseminated across a network is dependent on the strength of the existing ties between its members (Hansen, 1999). The establishment and consolidation of social ties enriches the size and depth of one's own network increasing the potential for the sharing of private information and cooperation (Granovetter, 1973). Since, by definition, outsiders have limited number of ties within a network, access to such information is constrained, or subject to costly

acquisition. As embedded agents are exempted from the temporal and pecuniary costs associated with the access to network-specific information, distinction between this group and outsiders with fewer interpersonal and interfirm ties is bound to occur. The resulting effect causes a liability of outsidership (Johanson and Vahlne, 2009) that can be understood under the light of a transaction cost framework. A transaction cost is the cost associated with the participation in a market (Williamson, 1981). The set of relationships maintained by embedded agent have a given value that is network-specific and therefore subject to alteration, should that agent be redeployed in a new environment (Uzzi, 1999). That value, of which search and informational costs are examples, is the transaction cost that an outsider will face when entering a new network.

In interfirm alliances, repeated interactions through time breed familiarity and increase trust in partners (Gulati, 1995). Dore (1983) observed the same effect in the Japanese textile industry and referred to it as goodwill. The author further remarked that the repeated interaction and the close-knit ties that subsequently developed along the supply chain did in fact contribute to overall efficiency of the firm. As the repeated negotiations of business relationships between market agents are inefficient and complex—due to the unique character of factor inputs—and cost associated with in-house development is prohibitively large, firms often benefit in developing lasting relationships with partners. Outsiders, on the other hand, need to develop ties with members of a network from the ground up, a process that is often based on the establishment of reputations (Buckley and Casson, 1998). By establishing and perfecting organisational routines that are socially embedded in an environment, firms are more likely to build resources and capabilities that, while valuable, are highly context dependable and thus not fungible (Gulati and Sytch, 2007).

Geography and Embeddedness.—Location decisions are representative of the structural embeddedness of firms. Two contrary forces are at work for outsider firms that move into a new location. On the one hand, outsiders have to endure the aforementioned transactional and reputation costs from which locals are exempted. On the other hand, however, outsiders may benefit from a source of innovation that can supply them with a competitive edge over rivals.

Research has also shown the relationship between geography and embeddedness to hold at a more local level. For example, Dore (1983) and Romo and Schwartz (1995) have studied the embeddedness of textile manufacturers in regional production networks and observed strong levels of dependency on the local milieu. Transposing the same analysis to the field of entrepreneurship, Figueiredo et al. (2002) found nascent entrepreneurs to be so keen on remaining in their prior area of business location that they were willing to accept labour costs over three times higher. The extent to which an entrepreneur will go in order to remain in a familiar environment may be justified by two complementary motives. These are, respectively, spill-over effects and transaction costs.

Local entrepreneurs face no explicit costs to access their social and cultural environments (Caves, 1996). An incumbent in a given geography is more familiar with its networks and therefore disposes of greater social capital that can be employed on the attainment of a comparative advantage over its rivals (Davidsson and Honig, 2003). By juxtaposition, when an investor extends the operations of a firm beyond the familiar boundaries of his or her home location, that investor is incurring in a fixed transaction cost—the described cost associated with a market exchange. Specifically, any newcomer in a geographic market will need to costly search and acquire access to private infor-

mation of strategic utility that may well be freely available to embedded actors (Geletkanycz and Boyd, 2011).

Alternatively, too much embeddedness may create its own set of problems. Uzzi (1996) suggested that over-embeddedness can lead to feuding, choking-off of novel information from other parts of the industry, and welfare-like support of weak network members. Essentially, over-reliance on strong ties contributes to isolation by external barring innovation that enters the network via a flow of weak ties (Granovetter, 1973). By contrast, since outsiders can have different conceptions of social norms and attitudes, there is a greater likelihood for this group to identify and tap into arbitrage opportunities that were unnoticed by locals (Hennart, 2007). For example, Siegel et al. (2014) found that American firms operating in Korea exploited societal bigotry against employing women by hiring a larger share of female managers and thus ensuring a more competitive cost structure vis-à-vis rivals.

The optimal level of structural embeddedness in terms of overall fitness of the network may then fall within an intermediate range where parties are neither too tightly connected to fragmented social connections nor so loosely connected that they are unaware of who has information to provide, or who knows whom in order to request the information. One setting in which the too little/too much embeddedness dichotomy is of particular importance is that of the international firm. Researchers in international business have long theorised about a liability of foreignness, that is, the costs multinational enterprises doing business abroad face as a result of their unfamiliarity with local environments (Hymer, 1976; Zaheer, 1995). Internationalising firms need to adapt to different contexts whenever leaving their home country. In doing so, these firms will face a liability of foreignness, a term describing the additional costs faced by firms operating outside

their home countries experience. Similar in essence to the issues affecting other outsiders to a network, foreigners will incur in costs originated in their limited local knowledge and potentially face discriminatory attitudes from local stakeholders (Nachum, 2010). Zaheer (1995) found that while foreign firms tend to possess a source of competitive advantage over their native rivals, the capabilities required to enact such advantage can be difficult to identify and to copy or acquire. Johanson and Vahlne (1977), Kogut and Singh (1988), and later Barkema et al. (1996) have also reported on the cultural barriers firms face when expanding internationally and the ”double layered acculturation” processes required for learning and effectively competing in foreign markets. In practice though, and in spite of the challenges and costs that would not otherwise be faced, economic agents actively abandon their native milieux in order to seek new business opportunities elsewhere. Entrepreneurs may seek markets where their skills and resources are scarcer and more valuable (Deephouse, 1999). In a meta-analysis of over 120 studies Kirca et al. (2011) concluded that internationalisation enabled companies to access higher returns than they would had they remained in their domestic domain. The key, the authors argued, lied in the effective transfer of firm-specific assets to a foreign context.

The findings described in the last paragraph are representative of the similarities found when comparing foreignness to outsidership. At the centre of each of the two phenomena lies a trade-off that weighs in the benefits derived from the control of outsider-specific assets against the costs associated with the lack of familiarity with the new environment.

IV. Hypotheses

The following chapter develops and elicits a set of the testable hypotheses relating entrepreneurial ability and structural embeddedness to new business performance and to the likelihoods of firm transfer or closure. First, I will examine how ability—defined as the ex-ante productivity in paid-employment—and embeddedness—the physical distance from the old workplace—relate to a set of performance dimensions of subsequently created ventures. The effect for how embeddedness in as environment serves as a mediator for ability is also tested with the interaction between the two variables. Afterwards, comes the analysis of the decisions to keep, transfer, or close a venture. Two different sets of hypotheses regarding these decisions are tested: one set assessing the role of opportunity cost and another measuring the impact of embeddedness. Finally, I follow the career paths of entrepreneurs leaving a venture for other occupations in self- or paid-employment. The goal here is to seek for patterns of specialisation into serial entrepreneurship, particularly in those individuals with higher levels of ability.

A. *Firm Performance*

Entrepreneurial Ability.— Ability is defined as a human capital factor la Schultz (1975), that is, a set of heterogeneously distributed skills that allow for the superior identification and development of business opportunities in an ever-changing environment. A nexus between emergent business opportunities and enterprising individuals is therefore crucial for the understanding of the dynamics associated with entrepreneurial activity (Venkataraman, 1997), as is the variation in the ability, or quality, to identify these opportunities (Holmes and Schmitz, 1990). Individuals employ differing degrees of ability to "discover, evaluate, and exploit" (Shane and Venkataraman, 2000: p.218) opportunities present-

ed by new goods, services, raw materials, and organising methods. The exploitation of opportunities can be operationalised in self-employment with the creation of a new firm, or pursued within the framework of an existing organisation (Casson, 1982; Eckhardt and Shane, 2003). The case of the latter is exemplary of the value of knowledge-based resources—such as entrepreneurial ability—to established organisations and is reflected in the superior compensations offered to the workers who control these resources (Wiklund and Shepherd, 2003).

The acknowledgement that the ability to exploit emerging opportunities is a scarce resource valued by organisations provides us with means of exogenously assessing individual ability prior to entry in entrepreneurship. As Becker (1975) pointed out in his theory of human capital, individuals with greater levels of general human capital will be more mobile in the labour markets, as their skills tend to become applicable to a larger cross-section of organisations. Entrepreneurial ability fits this definition of general human capital and may hence be interpreted as such. Ability, although not observed by the researcher, is known by the person and evidenced in the respective level of productivity. With time, information asymmetries regarding the quality of the worker are mitigated and employers improve their knowledge about worker productivity. As a consequence, earned wages will, amongst other factors, reflect the individual ability. This ability can then be estimated as the wage differentials from otherwise comparable workers after controlling for other relevant wage determinants. Since virtually all entrepreneurs have, at some point in time, engaged in paid-employment activities, the proposed notion of ability can be tested as a component of general human capital that is time-persistent and therefore transposable from between occupations. Since the observation of each future person as worker occurs before the creation of the first entrepreneurial venture, the researcher is

then able to exogenously examine the impact of previously estimated ability on firm performance. Specifically, I predict that:

Hypothesis 1) *Prior productivity as wage-worker is positively affects the performance of firms created as an entrepreneur.*

Structural Embeddedness.—A second factor associated with ability that also influences the performance of entrepreneurial ventures is the degree of structural embeddedness of a person in a given milieu. Structural embeddedness emphasises the contextualisation of the dynamic patterns of interpersonal relations and its effects on economic outcomes (Zukin and DiMaggio, 1990). Structurally embedded actors benefit from a central strategic position in a network by virtue of being involved in many significant ties (Wasserman, 1994). Outsiders, by contrast, are hampered with uncertainty concerning any pre-existing environmental conditions and network relationships (Johanson and Vahlne, 2006). The challenges that newcomers are faced with and have to overcome are particularly evident in the internationalisation process of corporations. These arise in part from being unembedded in local social networks, from insufficient integration with the existing information network (Mezias, 2002), and from a "lack of roots in a local environment" (Zaheer, 1995: p.343), compounded by a perceived deficiency in the legitimacy of a foreign firm in the host country.

The distinctive characteristics of outsiders to a milieu are not unique to foreigners, but rather rooted on the uncertainty of those who are not affiliated with a network (Johanson and Vahlne, 2009). For the prospect entrant, the lack of market-specific business knowledge and relevant network positions constitutes action liability of outsidership

(Rugman and Verbeke, 2007). Any entrepreneur entering a new market will incur in a fixed external transaction cost, the cost of market participation. Specifically, new entrants will need to costly search and acquire information that may well be freely available to local actors. Also, entrepreneurs seek legitimacy to reduce perceived risk by associating with, or by obtaining explicit certification from, well-regarded individuals and organisations (Shane and Cable, 2002). In order to gain legitimacy, organisations find that they must learn how to conform to the social patterns and behaviours of dominant actors in their environment (Meyer and Rowan, 1977). Entrants will need to expend resources in establishing a reputation by conveying information about the quality of the assets employed to other market participants (Buckley and Casson, 1998). This process signifies a time expenditure, as the signalling of reputations is solidified through repeated interpersonal and inter-organisational relations within a network.

In the uncertain and dynamic conditions under which entrepreneurial activity occurs, resource holders—particularly potential investors and employees—are bound to seek information that helps to gauge the underlying potential of a venture (Hoang and Antoncic, 2003) The difficulties outsiders face in order to overcome information asymmetries about their quality and credibility goes so far as limiting the mobility of entrepreneurs. Figueiredo et al. (2002) found that entrepreneurs were willing to accept labour costs over 3 times higher in their local regions. The authors associated this home-field bias to the value of non-transferrable assets, namely the networks of institutions and relationships of trust among economic actors that develop within local cultures.

The information asymmetries associated with both the transaction costs and other non-transferrable assets, for example—reputation, put outsiders in a position of natural disadvantage against not only established firms but also against other new ventures creat-

ed by insiders to the network. Since such costs constitute an important liability for outsiders to overcome, I hypothesise that:

Hypothesis 2a) *Structural embeddedness in a network has a positive impact on the performance of new firms.*

In practice though, and in spite of the challenges and costs that would not otherwise be faced, economic agents abandon their native milieux in order to seek new business opportunities elsewhere. Granovetter (1973) noted that whilst the dissemination of existing information is more prevalent in agents who have developed strong interpersonal ties, novel information is introduced into a network from its fringes by agents with weak or no ties to those near the core of the system. According to this interpretation, instead of being taken as a liability, lack of embeddedness is an asset and signals the attempt of an entrepreneur to exploit an arbitrage opportunity. Informational asymmetry still exists but benefits insightful outsiders with new ideas rather of insiders with a sound knowledge of the milieu. Entrepreneurs enter in new, unfamiliar networks in order to fill gaps in market opportunities (Casson, 1982). Outsiders who control scarce resources of complex replication may be able to capture and sustain a competitive advantage over locals even when embeddedness within the local network of ties is insufficient. This is the arbitrage role of the entrepreneur—using scarce skills and resources, entrepreneurs discover and exploit business opportunities ignored by existing network insiders (Deephouse, 1999). What is more, newcomers to a network may have increased room to manoeuvre, as they are not bounded by, and hence need not to conform with, existing social norms and attitudes (Phillips and Zuckerman, 2001). Uzzi (1996) suggested that over-embeddedness can lead

to feuding, choking off of novel information from other parts of the industry, and welfare-like support of weak network members. By contrast, outsiders may be able to enjoy a profit advantage by exploiting local inefficiencies based on culture-specific conventions and norms (Rosenzweig and Singh, 1991). Siegel et al. found an example of this exploitative behaviour (2014) in American firms operating in Korea. These firms successful used the prevalent bigotry against women in the host society to their own benefit by employing a larger share of female managers and thus ensuring greater competitiveness in their cost structure vis-à-vis local rivals.

As described, entrepreneurs who have the intention of entering a new milieu need to weigh in the benefits derived from the control of valuable assets against the liabilities associated with their outsidership. Following this argument, entry only takes place when the expected pay-offs of the former surpasses the estimated costs of the latter. The realised entry then credibly demonstrates the belief of the entrepreneur concerning the existence of the basis for a sustainable competitive advantage (Barney, 1991). In spite of potential cognitive biases—explained by factors such as the lack of embeddedness in an environment (Johanson and Vahlne, 2006) or the over-optimism in regard to business outcomes (Cooper et al., 1988; Lowe and Ziedonis, 2006)—entrepreneurs who anticipate that the control of specific resources and capabilities will grant them the basis for a sustainable competitive advantage will still decide to enter a new market, so that:

Hypothesis 2b) *Structural embeddedness in a network has a negative impact on the performance of new firms.*

In addition to its first order effect on the performance of newly created ventures, structural embeddedness also conditions the range of how individuals may exert their entrepreneurial ability. Embeddedness affects the extent and effectiveness of entrepreneurial ability by delimiting the boundaries of the social networks within which individuals act. Informational asymmetries between economic agents constrain or enhance the knowledge of, and subsequent access to, novel business opportunities (Casson, 1982). Environmental alertness required for successful opportunity exploitation (Kirzner, 1999) can therefore be interpreted as a mediator for entrepreneurial ability.

As social networks affect the flow and quality of disseminated information (Granovetter, 2005), it can be conceived that agents with stronger interpersonal ties are better prepared to correctly assess the merits and pitfalls of a given opportunity. In this case, embeddedness acts as a natural amplifier to entrepreneurial ability increasing the informational input and broadening the horizon of opportunities that can be acted upon. Formalising, we have that:

Hypothesis 3) *Structural embeddedness has a positive mediating impact on entrepreneurial ability and consequently on the performance of new firms.*

B. *Continue, Transfer, or Close*

Different Forms of Exit.—Recent contributions to the study of entrepreneurial dynamics have sought to emphasise the distinction between the departure of the entrepreneur from a venture by closure or by the transfer of its control to another businessperson (Headd, 2003; Bates, 2005; Wennberg et al., 2010). Fortune and Mitchell (2012) argued that business dissolution entails a selection process that removes both the entrepreneur and his

underlying capabilities from the landscape, while the transfer of a firm represents a selection process that removes the corporate entity whilst preserving some of its organisational capabilities within the economic environment. The persistence of organisational capabilities after the departure of the founder is significant in that it serves as a measure of the expected quality of a firm to a buyer. Buyers invest in vintage capital that retains some of its value and by doing so they free-up resources that the seller allocates to the pursuit of nascent opportunities elsewhere (Penrose, 1959; Chari and Hopenhayn, 1991). Hence, the transfer process facilitates the division of labour in the entrepreneurial market as the highest ability individuals choose to specialise in firm creation and the lesser able to focus on the management of already existing firms (Holmes and Schmitz, 1990).

Entrepreneurial Ability.—On the other hand, firms managed by lesser able entrepreneurs face a greater risk of discontinuance, because of its relative inefficiency, and a lower probability of transfer, as buyers choose better performing ventures and the opportunity cost of the entrepreneur are lower. The link between the business transfer probability and the ability of the entrepreneur can therefore be formalised by the hypothesis:

Hypothesis 4) *Entrepreneurial ability increases the likelihood of business transfer.*

But what about firms which are neither closed nor transferred? The set of firms who remain in operation through time under the same management account for the majority of the total population, so how do they compare to the remaining businesses and who ends up running them? Population ecologists (Hannan and Freeman, 1977, 1989), evolutionary theorists (Nelson and Winter, 2002), and industrial organisation scholars (Gort

and Klepper, 1982; Agarwal and Gort, 1996) have repeatedly sustained the argument that the least efficient firms in an industry will, over time, be selected out of a market. In comparison, surviving firms will be those that satisfy the efficiency condition—at least to the extent that guarantees their subsistence. As noted in an early remark by Penrose: "positive profits can be treated as the criterion of natural selection—the firms that make profits are selected or 'adopted' by the environment, others are rejected and disappear" (Penrose, 1952: p.810).

The adoption of biological analogies and its translation in the context and theory of the firm aid in the argument that businesses ran by lesser capable entrepreneurs face higher chances of closure. According to this perspective, firm performance and longevity are co-determined by the managerial ability of the entrepreneur, which is why closure is often interpreted as a failure. A quick survey of the literature in entrepreneurial success demonstrates the prevalence of this view, with a number of contributions using human capital inputs, usually level of schooling and experience, as determinants of the success of new firm success, measured as survival (Bates, 1990; Holmes and Schmitz, 1996; Åstebro and Bernhardt, 2003; Dahl and Reichstein, 2007). Following this view, it can be predicted that, due to the positive effect of ability on business quality and hence longevity:

Hypothesis 5a) *Entrepreneurial ability decreases the likelihood of business closure.*

An alternative approach to the relationship between the survival of new firms and the ability of the entrepreneur uses the notion of opportunity cost as the major driver for explaining business closure. Entrepreneurs with better outside alternatives will be more

likely to discontinue their businesses if they are unable to sell them, while those with fewer or no external alternatives will tend to hold on for longer (Arora and Nandkumar, 2011). Discontinuance can hence come as the result of the choice to act upon rising opportunities in the outside world instead of the failure of the fundamentals of a business (Penrose, 1959).

It should be clarified that the distinction between closure by insufficient economic performance and closure as means to pursuit other alternatives is explained with the heterogeneity in entrepreneurial ability. Individuals with higher ability will benefit from better external options and will attempt to transfer their firms in order to free-up the necessary time and capital resources to act upon those opportunities. Their ventures may, however, fail to attract the attention of prospect buyers, even if their fundamentals are sound enough to guarantee the survival of the business (Holmes and Schmitz, 1990). In the event the latter possibility occurs, the entrepreneurs will need to weigh-in the opportunity cost of maintaining the current venture versus the option to discontinue it in order to follow other opportunities (Gimeno et al., 1997). A decision to exit by firm closure will reveal a mismatch between the present market value of individual ability and the quality of the created venture (Holmes and Schmitz, 1995). Notice that this does not imply that the quality of the created business is independent from the ability of the entrepreneur. Instead, as new opportunities continuously rise, market conditions change and so does the relative value of individual ability and/or of the quality of the firm. Lucas (1978) partially anticipated this effect in his model of industry evolution, explaining business closure as a voluntary change by entrepreneurs who shift to paid-employment where wages have become more attractive.

A relevant side-effect of this decision is the possibility that a relatively efficient business is discontinued, not for lack of sustainability of its operations, but by its inability to generate a rate of return that is sufficiently high for the entrepreneur to keep it (Arora and Nandkumar, 2011). By contrast, it is conceivable that other lower quality firms remain in operation, as their owners will not have access to better external alternatives. Should the effect of opportunity cost dominate over the impact of entrepreneurial ability on firm survival, we will have a competing hypothesis formalised as:

Hypothesis 5b) *Entrepreneurial ability increases the likelihood of business closure.*

Structural Embeddedness.—The expected impact of structural embeddedness, or lack of, on the probabilities of business transfer or closure is consistent with the aforementioned link between network ties and the flow of information in an environment. Researchers in international business have long theorised about a liability of foreignness, that is, the costs multinational enterprises doing business abroad face as a result of their unfamiliarity with local environments (Hymer, 1976; Zaheer, 1995). More recent contributions by Johanson and Vahlne (2009) generalised the set of transaction costs incurred by those entering networks they are unfamiliar with as a belonging to a broader liability of outsidership. Outsiders need to develop ties with members of a network from the ground up, a process that is often based on the establishment of reputations (Buckley and Casson, 1998), a time- and capital-consuming process. By definition, outsiders simultaneously have fewer strong ties, which have the advantage of facilitating information exchange, and a smaller network of contacts to draw upon, which limits the scope of potential business buyers. Adding-up the two factors, one effectively obtains an entrepreneur who, in-

spite of her level of individual ability, will only have access to a limited, ill-informed network of prospect buyers. It is therefore theorised that, for any given level of ability:

Hypothesis 6) *Structural embeddedness increases the likelihood of business transfer.*

Hypothesis 7) *Structural embeddedness decreases the likelihood of business closure.*

C. *Entrepreneurial Specialisation*

Specialisation into Serial Entrepreneurship.—The first hypothesis developed in the present section speculated on the theoretical relationship concerning past levels of productivity exhibited by future entrepreneurs and the performance of subsequently created ventures. From there, I derived a further number of hypotheses relating both individual ability and structural embeddedness to entrepreneurial outcomes. Within this framework, the alertness in regard to new emerging opportunities and its exploitation by entrepreneurs plays a transversal part in the analysis of distinct mechanisms for individual action ranging from the division of labour to the opportunity cost of competing alternatives. In particular, differences exist in the individual competences required for the performance of different entrepreneurial tasks as the founding of new firms or the management of already established organisations.

Entrepreneurship is not confined to process of starting of new business (Cooper et al., 1988), nor is it a one-shot occurrence (Birley and Westhead 1993). As discussed, individuals may enter entrepreneurship via transfer, that is, the acquisition or the inheritance of an existing business. Entrepreneurs differentiate themselves from other market actors in the way they perceive business opportunities (Venkataraman, 1997; Ucbasaran

et al., 2007). Kirzner (1979) asserted that the entrepreneurs were cognitively different and were driven by a sense of environmental alertness, which consisted of a set of perceptual and cognitive processing skills that navigate and facilitate the mapping of nascent business opportunities. The ability to identify emerging opportunities before others do consists of a valuable resource capable of delivering a competitive advantage over rivals (Gaglio and Katz, 2001). It is the basis of what was described before as entrepreneurial ability and hence expected to be reflected in the performance of firms created by those with higher levels of this resource. Consequently, individuals who control this ability have an incentive to specialise in opportunity identification, which in practice is operationalised via the cyclic process of business creation-transfer-creation. What is more, the imprinting of founders on an organisation persists long after their departure from the organisation, with its consequences being noted not only on the culture and knowledge (Argote et al., 2003) but also on the longevity of the firm (Nelson, 2003; Geroski et al., 2010).

Two implications rise from what was presented in the last paragraph. First, that higher ability leads to specialisation into serial entrepreneurship because of the superior comparative value of creating new firms vis-à-vis managing existing ones. Second, that the influence exerted by the founder on the firm outlasts her tenure there, making ventures started by more apt individuals more attractive to potential buyers and thus easier to benefit from when the founder leaves. Therefore, we expect to find a relatively high portion of entrepreneurs with higher levels of ability amongst those who engage in serial entrepreneurship, that is, those who habitually engage in the development of new ventures in a sequential manner. Hence:

Hypothesis 8) *Entrepreneurial ability increases specialisation in serial entrepreneurship.*

V. Data and Methods

A. *Data*

The data used in the present work is constructed from two different sources. First, the *Quadros de Pessoal* (*QP*) set, a longitudinal linked employer-employee survey conducted by the Portuguese Ministry of Employment to every firm employing paid-labour in manufacturing. Compiled on a yearly basis, the *QP* survey contains detailed information on a number of characteristics of firms and the individuals working at them. The survey has a mandatory character with all firms employing paid labour being legally required to register, regardless of industry, size, or legal form. The source does not cover the self-employed who do not employ any other persons, but aside than these, it provides a comprehensive overview of the economy. The series ranges from 1985 to 2009 with firms and individuals being tracked through time via a system of unique identifiers.

A second source, provided by the Portuguese Directorate-General for the Territory, was used in the measurement of the physical distance across municipalities. The distance between the location of the current venture of an entrepreneur and the location of the firm where the individual worked prior to the start of the first self-employment spell served as a proxy for the level of embeddedness in a given milieu.

The following subsection provides an exploratory analysis of the data sources and respective dependent, explanatory, and control variables employed in the empirical models. A theoretical contextualisation of their choice to study entrepreneurial phenomena is also developed. Table 1, compiles a summary of the major variables employed in the present work. Ability, the variable linking past productivities to entrepreneurial outcomes is estimated from a high-dimensional fixed effects wage regression model for the years 1985 – 1991 detailed in the Methodology subsection and theoretically developed in the

preceding chapters. Therefore, whilst the data for the Ability variable were estimated prior to the observation of the 1994 – 2009 panel, its application is done in the subsequent study of entrepreneurial success.

Table 1—Summary of Variables Employed

Variable	Definition
Ability	Individual fixed-effect from HDFE wage regression (1985 – 1991); Estimation details are presented in the Methodology section
Distance (km)	Distance between the geodesic centres of the last observed municipality as worker and current municipality as entrepreneur
Outsider	Dummy variable equal to 1 if last municipality as worker is different and not adjacent to current municipality as entrepreneur
Schooling	Years of schooling of the individual
Age	Age of the individual
Prior Experience	Dummy variable equal to 1for those with at least one previous self-employment spell
Necessity	Dummy variable equal to 1for those who started a firm after the exit from paid-employment was due to business discontinuation
Male	Dummy variable equal to 1 if male
Foreign	Dummy variable equal to 1 if foreign
No. Work	Number of workers employed in the firm, log of in estimation
Sales Revenues	Deflated sales revenues, log of in estimation
Labour Growth	Yearly variation in number of workers, yearly difference of logs in estimation
Sales Growth	Yearly variation in sales revenues, yearly difference of logs in estimation
Firm age	Age of the firm at year *t*
Closure	Dummy variable equal to 1 if firm closure on year *t*
Transfer	Dummy variable equal to 1 if firm transferred on year *t*

The Quadros de Pessoal Survey.—Most of the data used in the present dissertation originates on the *QP* survey. Both firm- and individual-level data were taken from this source

in the construction of the final data-set. Firm-level data includes the number of workers employed, sales revenues, industry of activity and the municipality where its branches are located. Individual-level variables include professional information and socio-demographic characteristics. The former comprises of wages earned as paid-workers, prior entrepreneurial experience, and a proxy for necessity entrepreneurship. The latter is divided into age, gender, level of schooling, and nationality.

One differentiating factor of the *QP* data set is the very long temporal frame covered in its series. This characteristic makes the survey especially suitable for the purposes of the present analysis. The estimation of the proxy for entrepreneurial ability can only be done if the same individuals are distinctively observed in paid- and in self-employment, as the measure of ability depends on evaluation of productivity made by a former employer via a wage. To achieve this, the data were severed into a couple of subseries: one commencing in 1985 through 1991 and a second ranging from 1994 to 2009. The gap corresponding to the years 1992 and 1993 serves a buffer to ensure a clear cut-off point between the observations in the two sets.

The first subset takes all active firms and respective workers during the 1985-1991 period and estimates high-dimensional fixed-effects wage regression model from which the proxy for entrepreneurial ability is estimated. A detailed discussion of the estimation procedure for the variable can be found in the Methodology section of this chapter. Because of estimation requirements of the high-dimensional fixed-effects method, only individuals with at least two years of data during the period were included in the analysis. In the end, the panel followed 2,871,053 employees and 207,259 companies over 7 years for a grand total of 8,489,053 observations.

Individuals were subsequently followed into the second part of the panel in order to observe those who started new ventures. A unique identifier number for individuals and firms allowed for the longitudinal tracking of the fates of each. Only firms created after 1993 by individuals observed in the previous panel were considered. This amounts to a total of fifteen firm cohorts. The individual-level data for the year of 2001 is missing from the set making it impossible to unambiguously identify the founder(s) of companies in that year.

The 1994 – 2009 panel is made of firms managed by no more than one entrepreneur at any given point in time. This restriction facilitates the observation of a business transfer between entrepreneurs, albeit at the cost of a systematic selection of what are mostly larger firms with more than a single owner. Also, as the pool of workers for whom ability was estimated remains constant through time, the number of new firms entering the market will be relatively small in the first and final years of the sampling. The data pattern can be understood if one considers that during the first years of observation only a portion of individuals will have made the transition from worker to entrepreneur whilst in the latter of analysis most of the sampled individuals will already have started their own companies or exited the market altogether.

The data are right-censored and ends on 2009 for all firms, irrespective of their starting time, and that means that the maximum potential age that individual firms can reach is different for each cohort. Whereas firms from the 1994 cohort can reach a maximum of fifteen years of life, the ones from the 2008 cohort can reach, at most, two years.

The IGEO Data-Set.—The *Informação Geográfica* (*IGEO*) data set comprises information on the distances between geodesic points within each of 308 Portuguese municipalities, which are local administrative units. Of these, 178 are located in mainland Por-

tugal each with an average population of 6,500 inhabitants. Mainland Portugal has a small area with less than 92,000 square-kilometres and a longest straight-line distance at 600 kilometres. With a relatively large number of municipalities for such an area, a great degree of granularity in the localisation of the individuals before and after the start of a new venture is possible. Whilst even more detailed information identifying the firm location by civil parish, the lowest level administrative unit in Portugal, was available in the *IGEO* data set, the *QP* survey only included this information from 2002 onwards. The choice was then to sacrifice small amount of precision on measure of distance maintain so that a longer series with more firm cohorts could be followed.

Distances between municipalities were calculated from the geodesic centre of the administrative capital town or city of each municipality to all other locations. This produces a matrix of distances that was merged into the *QP* survey via a variable that was present on both sources, a unique municipality three-digit code. From there, it was possible to locate both the last municipality the person was observed on while being a worker as well as the place of the venture the same individual developed activities as an entrepreneur. Knowing these two locations then allowed for the retrieval of the distance provided by the *IGEO* matrix.

Dependent Variables.—Hypotheses 1 through 3 relate ability and individual embeddedness to the performance of the venture created by the entrepreneur. For hypotheses 4 to 8, the likelihood of each studied event is measured by the conditional probability of its specific occurrence. Market performance is measured by the initial firm size and subsequent rate of growth. Initial firm size is measured by the natural logarithms of the number of employees and the deflated sales revenues, respectively. Growth is defined as the an-

nual logarithmic changes on each of these variables. Firm size in an industry context serves as a proxy for economic performance by capturing the efficiencies and market power associated with employing a larger number of workers and controlling a larger share of the market (Marshall and Weiss, 1967). Ceteris paribus, large firms have all of the options of small firms, and, in addition, they can invest in lines requiring such scale that small firms are excluded (Baumol, 1959). Additionally, by observing firms at entry we are ensuring that no selectivity associated with a survival bias takes place in the data. Performance measures based on size rather than profit also benefit from being less prone to misreporting by firm managers. Recent evidence on corporate tax evasion (Beck et al., 2014) has highlighted some limitations regarding the reliability of profitability-based measures of performance on smaller firms. It should nonetheless be noted, that whilst using sales revenues—which is a component of profitability—in the statistical analysis, it is unlikely that a systematic bias in this variable persists in the data. Respondents of the *QP* survey are explicitly guaranteed anonymity and legal confidentiality in their answers, a measure designed to mitigate misreporting of revenues for tax avoidance schemes.

The descriptive statistics for number of employees and sales revenues reported on Table 2 are not linearized in order to facilitate the interpretation. At just over 5 workers, single-owner firms employ a relatively small number of individuals and earn an average of less than €260,000 per year. These values are pooled for all firm ages and compare to an entry size of 3.08 workers and less than €165,000 in revenues for the first year of activity. A brief analysis of the total firm population during the same period reveals the mean number of workers to be approximately 9 and deflated yearly revenues at €283,000.

Firm growth is intrinsically associated with firm size, particularly in small firms (Evans, 1987a) and is a widely adopted measure of performance (see Bitici et al., 2011

for a recent review). According to a meta-analysis of 55 articles by Delmar (2006), variations in sales turnover and personnel each account for roughly 30% of the employed in the literature. Faster growing firms are able to seize positions of competitors and increase market power (Evans, 1987b). Higher growth rates also attributable to an improved understanding of current market conditions and a more accurate prediction of changes in those conditions (Birley and Westhead, 1990). The potential survival bias present in firm growth data—there is no growth data for discontinued firms—is accounted for with the Heckman (1979) selection procedure detailed on the Methodology section of the present chapter.

Table 2—Descriptive Statistics (1994 – 2009)

Variable	Obs.	Mean	S.D.	Min.	Max.
Ability	208,848	0.00	2.56	-13.72	8.37
Distance (km)	208,848	25.03	67.17	0.00	483.25
Outsider	208,848	0.09	0.22	0.00	1.00
Schooling	208,848	8.61	3.80	0.00	16.00
Age	208,848	43.53	8.37	18.00	93.00
Prior Venture	208,848	0.08	0.27	0.00	1.00
Necessity	208,848	0.09	0.21	0.00	1.00
Male	208,848	0.75	0.43	0.00	1.00
Foreign	208,848	0.07	0.25	0.00	1.00
No. Workers	208,848	5.28	38.90	1.00	12,015
Sales Rev.	207,656	256,182	916,785	0.00	28,000,000
Firm age	208,848	4.80	3.49	1.00	16.00
Transfer	208,848	0.01	0.11	0.00	1.00
Closure	208,848	0.09	0.47	0.00	1.00
Growth Work.	142,423	0.01	0.38	-4.47	4.48
Growth Sales	142,423	0.01	0.04	-0.17	18.62

Table 3 disaggregates the two studied types of firm growth rates across age cohorts. The table shows growth rates declining with increases in firm age. A couple of ex-

planations can account for this phenomenon. First, growth rates are, in absolute terms, smaller for larger companies. Consequently, and since firms grow with, older firms tend to be larger in size and hence grow less as they age. Second, financing constraints of new ventures tend to be gradually lifted with firm age (Cabral and Mata, 2003). This effect is responsible for the more robust growth rates observed during the earlier years of the life of firms. With time however, companies approximate their long-term efficiency scale and growth declines.

Table 3—Average Growth by Firm Age (1994 - 2009)

Age Group	Growth Workers	Growth Sales
1 — 3	5.87%	81.83%
4 — 6	1.56%	33.72%
7 — 9	0.35%	11.13%
10 — 15	-1.46%	5.23%

The dependent variables used for testing hypotheses 4 to 8 explore discrete events derived from entrepreneurial decisions. In hypotheses 4 to 7 the events are the comparison between the choices of closure, transfer, and continuation in the management of a venture during that year. For hypothesis 8, it is the starting of a new firm on a given year.

Independent Variables.—The explanatory variables of interest operationalise the dimensions of entrepreneurial ability and outsidership introduced in the Survey chapter and thereafter additionally detailed during the exposition of the testable hypotheses. Entrepreneurial ability, estimated from the wages earned prior to entry in self-employment via a high-dimensional fixed-effects method, is sub-divided into 4 categories corresponding to the quartile intervals of its distribution. The choice enriches the interpretation of an oth-

erwise linear effect to correspond to the distinct outcomes verified across the distribution. Similarly to the procedure adopted by Stata for the computed fixed-effects estimates, the density of entrepreneurial ability has a zero average and a standard deviation of one. The estimated fixed-effects included all working population during the period, from which only those who became entrepreneurs were sampled, skewing the used ability distribution to the left and greatly increasing the standard deviation to 2.56, as depicted on Table 2. The following methodology section offers a more detailed explanation of the estimation procedure used to obtain this variable.

Correlations of entrepreneurial ability with other variables show a strong negative relationship with necessity entrepreneurship, that is, entrepreneurs whose company closed in the two years preceding entry in self-employment, as well as weaker but still negative relationship with foreign nationals and firm closure events. Positive correlations are observed with the performance-based dependent variables, notably sales revenues, the likelihood of transfer and schooling, which serves as one of the proxies for human capital.

Adding to the previous remark, the cross-tabulation between the level of schooling and the ability of entrepreneurs depicted on Table 5 shows that while for the bottom quartile education achievements are distinctively lower, the distributions of schooling in the remaining quartiles are relatively homogeneous. This is particularly evident for the third and fourth quartiles, which, while maintaining minimal distributional differences in comparison with the third quartile, has marginally less college-educated and more middle school graduates than the third quartile.

Embeddedness is interpreted in terms of physical distance from the location where an individual previously worked. Whilst the information concerning the total time spent

by an individual in a given geographical milieu is incomplete, the long typically observed in the county during the period—an average of over 5 years—and the reduced labour mobility of the workforce (Centeno et al., 2008) suggest that the limited observation of previous work locations is a serviceable proxy for embeddedness.

Empirically, the choice was made to measure outsidership rather than embeddedness. This was done to provide a simpler interpretation of the explanatory variables, namely of the kilometre distance from the location of the last job. Two variables served as statistical proxies for the concept of outsidership. First, the kilometre distance between the municipalities where the individual was last observed as a paid-employee and where he founded a firm. A second variable which named outsidership, accounting for the lack of embeddedness, is a dummy equal to one when the municipality where the firm was started is either the same, or adjacent to, the municipality where the entrepreneur last worked as an employee. The construction of this variable was made possible by the previous efforts of Catarina Alvarez and Marta Lopes who, working with the *IGEO* set, kindly ceded the data to the author.

About one-fifth of new firms are started in a municipality different from, and with no borders with, the municipality where the individual was last employed. Of these, about 35% move into Lisbon and 20% to Porto, the two major urban centres of the country, which may reflect that the change is motivated by lack of economic conditions in the original location. Correlations between the proxies for outsidership and variables associated with business longevity and transfer suggest that the lack of familiarity with a new environment hamper not only the odds of survival but also the likelihood of finding a buyer for the venture.

Table 4 —Correlations (1994 - 2009)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Ability	1.00															
2. Distance (km)	0.01	1.00														
3. Outsider	0.02	0.68	1.00													
4. Schooling	0.13	0.04	0.04	1.00												
5. Age	0.07	0.00	0.00	0.03	1.00											
6. Prior Exp.	0.02	0.00	-0.08	0.06	0.04	1.00										
7. Necessity	-0.36	0.00	0.02	-0.15	-0.10	-0.11	1.00									
8. Male	0.05	0.03	0.02	-0.05	0.04	0.02	-0.07	1.00								
9. Foreign	-0.12	0.02	0.16	-0.05	-0.13	-0.06	0.10	-0.02	1.00							
19. No. Work	0.19	-0.01	-0.02	0.02	0.01	0.20	-0.01	0.01	0.00	1.00						
11. Sales Rev.	0.26	-0.01	-0.09	0.07	0.04	0.13	-0.04	0.03	-0.01	0.25	1.00					
12. Labour Growth	0.07	0.01	0.01	0.02	-0.05	-0.09	-0.06	0.01	0.00	0.04	0.02	1.00				
13. Sales Growth	0.15	0.08	-0.08	0.00	-0.09	0.01	-0.02	0.00	0.05	0.00	0.01	0.09	1.00			
14. Firm age	0.09	-0.13	-0.22	0.04	0.27	0.00	-0.31	0.02	-0.17	0.03	0.09	-0.08	-0.30	1.00		
15. Closure	-0.12	0.10	0.18	0.00	0.06	0.03	0.20	-0.02	0.12	0.00	0.01	-0.08	-0.03	0.06	1.00	
16. Transfer	0.17	0.00	-0.17	-0.01	-0.03	-0.01	0.01	0.00	0.11	0.00	0.00	0.01	0.01	-0.04	-0.08	1.00

Table 5—Distribution of Entrepreneurial Ability by Level of Schooling (1994 — 2009)

Schooling/Ability	P1 — P25	P26 — P50	P51 — P75	P76 — P100	Total
Primary	31.50%	25.90%	19.50%	17.40%	23.58%
Middle School	39.40%	40.70%	33.10%	37.00%	37.55%
High School	22.20%	19.80%	25.60%	24.40%	23.00%
College	6.90%	13.60%	21.80%	21.20%	15.88%

Controls.—Other explanatory variables commonly used as predictors of firm performance served as controls at both micro- and macro-levels. Starting with the former, the habitual set of individual socio-demographic characteristics as years of schooling, age, gender, and foreign nationality were included. Years of schooling and age serve as proxies for the quality of human capital accounting for the investment in formal and on-the-job training, respectively (Mincer, 1974). After controlling for education, age can also serve as a proxy for the existence of liquidity constraints, as individuals tend to become wealthier as they become older (Cabral and Mata, 2003). Both gender and foreign nationality are dummy variables that control for potential sexual discrimination by clients and other business partners (Becker, 1971; Fischer et al. 1993) and for the liability of foreignness (Zaheer, 1995).

Past self-employment experience was introduced for those who sequentially started more than one firm during the period ranging from 1994 to 2009. One caveat of this procedure is ignoring those who were worked as entrepreneurs prior to 1985 but employed during at least two years the time interval of the 1985 – 1991 sample.

Another individual-specific variable controls for necessity entrepreneurship. Necessity entrepreneurs are different from opportunity entrepreneurs in that the occupational choice is motivated by an exogenous factor, namely the lack of paid-employment

opportunities (Reynolds et al., 2005). The reduced scope of the alternative-set has implications on the voluntary character of entrepreneurial entry and consequences on the earnings obtained in self-employment with necessity entrepreneurs earning 30% less than their opportunity counterparts, according to German data (Block and Wagner, 2010).

Individuals were coded as necessity entrepreneurs if their last job prior to self-employment had been terminated by the closure of the firm. The limitation found in the criterion used to define this variable—it excludes all involuntary terminations that were not the result of discontinuation of business ran by the employer—is due to the inability of the *QP* survey in separating identify voluntary from involuntary contractual terminations. The practical implication of this bias in the analysis is the likely under-estimation of the effect of necessity entrepreneurship, as productive and unproductive employees are fired when the company closes. Still, I call the attention of the reader for the negative correlations between necessity entrepreneurship and the variables associated with measures of human capital. In particular, the -0.36 coefficient with entrepreneurial ability signals that those entering by necessity face a significant liability in self-employment.

At the level of the firm, model specifications control for a number of performance measures. Specifically, lagged firm size, assessed both in term of personnel and sales turnover served as controls of current performance and continuation, transfer, or closure decisions. On top of that, and due of the longitudinal nature of the data, firm age dummies retrieved any cohort-specific determinants of the regressands.

Finally, 85 two-digit SIC codes control for industry specific factors in all but the high-dimensional fixed-effects model. The choice was justified because of model speci-

fications—firm-level unobserved heterogeneity, a more fine-grained measure, was already accounted for. Also, year dummies control for other macro factors that identically affected the totality of the sample on a given year.

B. *Methods*

The statistical analysis of the predictions developed in the Hypothesis section consists of a set of different methodologies, developed in the text below. The level of expositional detail will vary according to the novelty and dissemination of each of the methods. Under this light, the high-dimensional fixed-effects method for the estimation of ability is extensively discussed, as well as its particular application in the context of the current analysis.

The testing of hypotheses 1 through 3 uses the ordinary least-squares (OLS) estimator with robust standard-errors to correct for potential heteroscedasticity when estimating the entry size of the firm and OLS with the Heckman (1979) correction procedure for the sample selection bias when measuring the firm growth.

Hypotheses 4 through 7 are tested with a multinomial model allowing for the evaluation of different possible mutually-exclusive actions taken by the entrepreneur. Finally, the predictions linking entrepreneurial ability to specialisation in firm creation, as described in hypothesis 8, use a negative binomial model to estimate the number of ventures started after the first one.

Estimating Ability.—The definition of entrepreneurial ability presented in the Survey chapter relied on a couple of principles: observability through performance and time-persistence. Entrepreneurial ability is not directly observable by the researcher, but im-

printed in the performance of managed firms. If a level of ability is specific to an individual and traceable through time, then it is possible to exogenously estimate individual ability prior to the start of the first self-employment spell. This is done via the examination of the employment wages earned before entering in entrepreneurship. Individuals, as well as their employers, are aware of their own productivity. A given employer will thus differentiate between workers with similar socio-demographic characteristics by paying a wage premium to the more productive individuals, as wages tend to reflect the productivity of labour. If other wage determinants are controlled for and included in a wage equation, then the remainder differential in earnings will the ceteris paribus individual productivity.

Ability is therefore analysed prior to the entry in entrepreneurship. Specifically, the chosen measure of ability uses a time-invariant, residual, component of the wage of the employee. To produce an unbiased measure of ability, all other relevant wage determinants need to be excluded. For this purpose, wage determinants follow the traditional Mincer (1974) characterisation and include the controls for education, experience, seniority, industry, firm, and—because of the longitudinal composition of the data—year of observation. The wage regression can then be written as:

$$(1)\ y_{\mathrm{ift}} = \lambda_{\mathrm{i}} + \theta_{\mathrm{f}} + \alpha_{\mathrm{t}} + \boldsymbol{\beta}' x_{\mathrm{ift}} + \varepsilon_{\mathrm{ift}}$$

where,

- y_{ift} represents the logarithm of the deflated monthly wage of each individual *i*, working form firm f on year *t*;

- $\boldsymbol{\beta}' x_{\text{ift}}$ are the observed time-varying characteristics of individual *i* and firm *f* in year *t*:
- time-varying characteristics of worker *i*—year of schooling, age, age-squared, seniority, and seniority-squared;
- time-varying characteristics of firm *j*: log of number of workers and industry;
- λ_i is the individual fixed-effect, here interpreted as ability;
- θ_f is a firm fixed-effect;
- α_t are 6 year dummies ranging from 1985 to 1991;
- ε_{ift} is assumed to follow the conventional random error assumptions.

The above wage function is then estimated with a fixed-effects model that accounts for unobserved individual-, firm-, and industry-level heterogeneity. Most statistical packages resort to sets of dummy variables to absorb any unobserved group-specific heterogeneity. This can be better understood if we rewrite equation (1) in matrix notation so that:

$$(2)\ \mathbf{Y} = \mathbf{X}\beta + \mathbf{D}_1\lambda + \mathbf{D}_2\theta + \mathbf{D}_3\alpha + \varepsilon$$

where $\mathbf{D}_1$, $\mathbf{D}_2$, and $\mathbf{D}_3$ are the group-dummies for worker, firm, and year, respectively.

High-Dimensional Fixed-Effects: Because of the very large size of $\mathbf{D}_1$ and $\mathbf{D}_2$, nearly 3 million workers and over 200,000 firms spanning 7 years of data, the usual least-squared matrix inversion method of estimation becomes computationally unworkable. Instead, I followed the procedure proposed by Guimarães and Portugal (2010) to fit

models with high-dimensional fixed-effects. The procedure, implemented in Stata via the `reg2hdfe` command, applies the full Gauss-Seidel, or zigzag, method as proposed by Smyth (1996), which produces a stable but slow iteration depending on the correlation between the parameter estimators. The application of an iterative algorithm as the zigzag method to solve normal equations is highly inefficient when compared to the closed-form least-square approach. However, this implementation has the advantage of not requiring the explicit calculation of the inverse of the $\mathbf{X'X}$ matrix.

Following the method proposed by Guimarães and Portugal derive the first-order conditions start with the set of normal equations:

$$(3)\quad \begin{bmatrix} \mathbf{X'X} & \mathbf{X'D}_1 & \mathbf{X'D_2} & \mathbf{X'D_3} \\ \mathbf{X'D}_1 & \mathbf{D}_1'\mathbf{D}_1 & \mathbf{D}_1'\mathbf{D}_2 & \mathbf{D}_1'\mathbf{D}_3 \\ \mathbf{X'D_2} & \mathbf{D}_1'\mathbf{D}_2 & \mathbf{D_2'D}_2 & \mathbf{D}_2'\mathbf{D}_3 \\ \mathbf{X'D_3} & \mathbf{D}_1'\mathbf{D}_3 & \mathbf{D}_2'\mathbf{D}_3 & \mathbf{D}_3'\mathbf{D}_3 \end{bmatrix} \begin{bmatrix} \beta \\ \lambda \\ \theta \\ \alpha \end{bmatrix} = \begin{bmatrix} \mathbf{X'Y} \\ \mathbf{D}_1'\mathbf{Y} \\ \mathbf{D}_2'\mathbf{Y} \\ \mathbf{D}_3'\mathbf{Y} \end{bmatrix}$$

multiplying and rearranging we obtain:

$$(4)\quad \begin{bmatrix} \beta = (\mathbf{X'X})^{-1}\mathbf{X'}(\mathbf{Y} - \mathbf{D}_1\lambda - \mathbf{D_2}\theta - \mathbf{D}_3\alpha) \\ \lambda = (\mathbf{D}_1'\mathbf{D}_1)^{-1}\mathbf{D}_1'(\mathbf{Y} - \mathbf{X}\beta - \mathbf{D}_2\theta - \mathbf{D}_3\alpha) \\ \theta = (\mathbf{D}_2'\mathbf{D}_2)^{-1}\mathbf{D}_2'(\mathbf{Y} - \mathbf{X}\beta - \mathbf{D}_1\lambda - \mathbf{D}_3\alpha) \\ \alpha = (\mathbf{D}_3'\mathbf{D}_3)^{-1}\mathbf{D}_3'(\mathbf{Y} - \mathbf{X}\beta - \mathbf{D}_1\lambda - \mathbf{D}_2\theta) \end{bmatrix}.$$

The above partition of the normal equations benefits from a convenient iteration strategy. To obtain the exact least-squares solution, one can simply alternate between estimation of β, λ, θ, and α. The expressions $(\mathbf{D}_1'\mathbf{D}_1)^{-1}\mathbf{D}_1'$, $(\mathbf{D}_2'\mathbf{D}_2)^{-1}\mathbf{D}_2'$ and $(\mathbf{D}_3'\mathbf{D}_3)^{-1}\mathbf{D}_3'$ used on the estimation of λ, θ, and α respectively, translate into simple

group averages of the fixed-effects of the regression of **Y** on **X**. When the estimation procedure converges, the coefficients on $\mathbf{D}_1\lambda$, $\mathbf{D}_2\theta$ and $\mathbf{D}_3\alpha$ must both equal one and the vectors $\mathbf{D}_1\lambda$, $\mathbf{D}_2\theta$, and $\mathbf{D}_3\alpha$ will contain all the estimated coefficients for the group-dummy variables. With this approach, it is possible to avoid the inversion of a very large matrix that would be required if we had simply added $\mathbf{D}_1$ and $\mathbf{D}_2$, $\mathbf{D}_3$ has smaller dimensions, to the set of regressors.

Estimating Firm Performance.—Firm performance is defined as the natural logarithms of initial size in terms of personnel and turnover and yearly the rate of growth of these variables. The estimation of initial size used an OLS regression with robust standard errors, following the correction proposed by White (1980), to account for probable heteroscedasticity in the disturbance term, which could affect inference power.

The estimation of the rates of firm growth needs some additional treatment to ensure the precision of its estimates. Unlike for entry size, the data concerning growth rates suffers from a survival bias. This problem is potentially the most serious for young firms that have high exit rates (Evans, 1987b). The widely implemented correction procedure suggested Heckman (1979) solves the issues created by the selection bias with a two-step estimator. The first step deals with the selection issue by estimating a probit model for the determinants of firm closure. The inverse Mills ratio from the probit model is then fitted along with the other covariates into an OLS regression for firm growth. In doing so, the initial survival bias is solved by the inclusion of a previously omitted variable.

Heckman Correction: More formally, we have a behavioural equation describing the determinants of firm growth for the firms in which growth information is observed—the survivors—and a selection equation—what determines firm closure:

$$(5) \quad g_{i1} = \mathbf{x}'_{i1}\beta + u_{i1}$$

$$(6) \quad d_{i2} = 1(\mathbf{x}'_{i2}\delta + v_{i2} > 0).$$

Note that we only observe g_{i1} when $d_{i2} = 1$. If the error terms are normally distributed with zero mean and one standard-deviation but correlated amongst themselves in the sense that the unconditional mean of u_1 is different from its expectation conditional on v_2:

$$(7) \quad \mathrm{E}(u_1|v_2) = \gamma v_2.$$

The general model for an interior solution, conditional on the survival of the firm can be expressed as:

$$(8) \quad \mathrm{E}(g_{i1}|\mathbf{x}'_{i1}, d_{i2} = 1) = \mathbf{x}'_{i1}\beta + \gamma\lambda(\mathbf{x}'_{i2}\delta)$$

with $\gamma\lambda(\mathbf{x}'_{i2}\delta)$ being a term that represents the correlation between the two errors and defined as:

$$(9) \quad \lambda(\mathbf{x}_{i2}{}'\delta) = \mathrm{E}(v_{i2}|v_{i2} > -\mathbf{x}'_{i2}\delta).$$

With a normality assumption $\lambda(\mathbf{x}_{i2}'\delta)$ may be estimated via a probit model as the inverse Mills ratio meaning that

$$(10) \qquad \lambda(\mathbf{x}_{i2}'\delta) = \frac{\phi(\mathbf{x}_{i2}'\delta)}{\Phi(\mathbf{x}_{i2}'\delta)}.$$

The Heckman correction procedure first estimates equation (6) with a probit from which (9) is then computed as an inverse Mills ratio to be included as a regressor on (5) in order to account for the firm selection bias.

Firm Continuance, Transfer, or Closure.—The distinction between alternative fates for a venture may be interpreted as a discrete choice problem in which the outcomes in every given period may be the continuing of operations under the same entrepreneur, which will serve as the baseline category, the closure of the venture motivated by the exit of the entrepreneur, or the transfer of the venture to another individual. Observing the frequencies of each event we have a total of 188,169 continuations, 17,964 exits by closure, and 2,715 exits by transfer, values that are consistent with those found in previous studies of managerial turnover (Holmes and Schmitz, 1996).

When considering how the choice of transfer or closure affects the likelihood of continuation on a given period one needs to acknowledge the theoretical differences in the determination of each outcome. Specifically, entrepreneurial ability may increase the probabilities of transfer and closure vis-à-vis the baseline. This may occur if the effect of opportunity cost opportunity cost present on entrepreneurial ability dominates the quality, or lack of, of management effect also included on the variable. Since the effects are expected to differ across the two alternatives, the reduction of three alterna-

tives to a set of pairwise comparisons performed by the multinomial logit model incurs the risk of creating biased estimates.

New Firm, Existing Firm, or Paid-Employment.—The final proposed hypothesis assesses whether there is specialisation into different activities across entrepreneurs. This is done by observing occupational choices occurring after the exit from an on-going entrepreneurial venture. The founding of a new firm, management of an existing firm, and the return to paid-employment were the three occupational alternatives taken into account, with the latter being the baseline category. Whilst self- and paid-employment occupational choices are intrinsically different in terms of associated risk and consequent expected return (Coase, 1937), the disaggregation of self-employment into creation and business development activities and management of already existing firms needs to be further justified. Business founding and initial development requires a different set of skills to those associated with the management of existing organisations. Specifically, founders have a more active role in the identification of potentially profitable business opportunities (Venkataraman, 1997) and imprinting their traits into the organisation (Geroski et al., 2010).

Finally, as with the prior set of alternatives—continuance, transfer, or exit—effects are expected to vary as different pair of alternatives are compared to each other, so a MNP methodology described below was implemented.

Multinomial Probit Model: The situations portrayed in the paragraphs above both combine a discrete choice problem with a panel data structure. Given that setting, the MNP estimator is a known suitable alternative for the estimation of such models for

couple of reasons. First, the MNP allows for the introduction of correlation across choices in the unobserved component by utilising normally distributed errors (Cameron and Trivedi, 2005). Albeit more computer-intensive to estimate than other multinomial models, a two-fold integral needs to be calculated, the MNP method guarantees that any unobserved correlation between outcomes, namely between transfers and closures, is accounted for. In the case of 3-alternatives model probabilities are evaluated by:

$$(11)\quad p_1 = \Pr(y=1) = \int_{-\infty}^{-\tilde{V}_{31}} \int_{-\infty}^{-\tilde{V}_{21}} f(\tilde{\varepsilon}_{21}, \tilde{\varepsilon}_{31}) d\tilde{\varepsilon}_{21} d\tilde{\varepsilon}_{31}$$

where $f(\tilde{\varepsilon}_{21}, \tilde{\varepsilon}_{31})$ is a bivariate normal with two free covariance parameters and $\tilde{V}_{21}$ and $\tilde{V}_{31}$ depend on regressors and parameters β.

Secondly, the multinomial probit (MNP) model avoids the potential drawbacks from the independence of irrelevant alternatives (IIA) present in other multinomial models, notably the multinomial logit model (Hausman and McFadden, 1984). One limitation of such models is that the discrimination among the *m* alternatives reduces to a series of pairwise comparisons that are unaffected by the characteristics of alternatives other than the pair under consideration.

VI. Results

The present chapter presents the estimation results for the models previously described in the Methods and Data chapter. Seven empirical models, each with a set of different specifications, tested the hypotheses on the data constructed from the combination of the *QP* and the *IGEO* sets. Results are contextualised by the theoretical predictions and within the range of earlier findings in the literature.

A. *Prior Productivity as Worker*

The first model estimates a wage regression for the periods ranging from 1985 to 1991 with the purpose of retrieving the proxy for entrepreneurial ability from its individual fixe-effect component. The second and third are OLS estimations of the entry size of new ventures, measured by number of employees and sales revenues. The fourth and fifth models introduce firm growth as dependent variable in order to understand the impact of entrepreneurial ability and embeddedness on a dynamic setting. The OLS estimation of the firm growth models uses the Heckman (1979) procedure to correct any potential issues rising from a survival bias.

Hypotheses 4 through 7 are evaluated via a MNP model with firm continuation, transfer, and closure being used as the alternatives. The section is concluded with another MNP regression that explores the different occupational choices of those who exited a previously managed venture. The alternatives in this case are paid-employment, the starting of a new firm, and the management of already existing venture.

Estimating Entrepreneurial Ability.—The variable entrepreneurial ability is a construction based on the wages earned by employees prior to the start of the first self-

employment spell. It is therefore necessary that the estimation of entrepreneurial ability occurs before that of the remaining empirical models. During the 1985 – 1991 time interval, the wages of nearly 3 million workers with at least two consecutive years of information were regressed on the traditional Mincerian determinants via a high-dimensional fixed-effects model.

Table 6—High-Dimensional Fixed-Effects Wage Regression (1985 — 1991)

DV = ln(def. monthly wage)	Coefs.
Schooling	0.033***
Age	0.010***
Age-squared	-9.09E-05***
Tenure	0.005***
Tenure-squared	-2.61E-06***
ln(no. Workers)	0.071***
Firm Age Dummies	YES
Year Dummies	YES
R-squared	0.687
Observations	8,489,053
Individuals	2,871,053
Firms	207,259

***** p<0.01, ** p<0.05, * p<0.1**

The small magnitude of the coefficients relative to those yielded by conventional pooled OLS models can be explained by the nature of the estimation method (Cameron and Trivedi, 2005). The presence of one or more omitted variables which account for unobserved heterogeneity in the data leads to a model with biased estimates and over- or underestimation issues. As I expected entrepreneurial ability to be correlated with other observable measures of human capital, the inclusion of a fixed-effect that captures should reduce the weight of the contributions of other worker-specific regressors on the expected wage. In fact, coefficients for schooling, age, and tenure are similar to other

fixed-effects estimations performed on the *QP* survey by Martins (2008). The slight difference in results in our data can be accounted for with the different time frame selected and by the inclusion of firm-specific fixed effects in the present model. A closer approximation to the chosen methodology to the data from the *QP* survey, albeit for more aggregate purposes, is present in Carneiro et al. (2012).

Asides from the specificities of the estimation method, the estimation results from Table 6 portray a number of well-established empirical relationships in labour economics. The observed returns to schooling represent the human capital investments prior to entry in the labour market (Mincer, 1974), while returns to experience, measured as age and quadratic age, and tenure account for the returns of general and firm-specific human capital investments (Becker, 1962).

B. *Performance of Entrepreneurial Ventures*

Hypotheses one through 3 established a theoretical link between entrepreneurial ability and embeddedness and the performance of new ventures, measured in terms of initial size and rate of growth. As mentioned, both number of employees and sales revenues serve as proxies for firm size, which further validates and increases the robustness of the findings. Each empirical model has 3 specifications. The first specification is a benchmark model and uses traditional socio-demographic variables as proxies for entrepreneurial ability. The second specification studies the impact of ability, in quartiles, and lack of embeddedness, the kilometre distance to the prior municipality, on firm performance, as predicted on hypotheses 1 and 2. The third specification tests for the mediating role of embeddedness on ability. The lack of embeddedness, described as outsid-

ership, is a dummy equal to one if the prior municipality of the entrepreneur is not the current one, or adjacent to the current one.

Finally, some notes regarding model specifications. The bottom ability quartile is the omitted baseline category and that the reported distance coefficients are multiplied by 10. All model specifications include 85 industry dummies and year dummies for the 1994 – 2009 period of analysis. Firm size at entry is the natural logarithm of initial the number of workers or sales turnover, so OLS coefficients are semi-elasticities. The rate of growth is the yearly difference between the natural logarithm of firm size.

Table 7 describes the determinants of the entry size of a new venture. Columns (1) and (4) serve as the benchmark model that contrasts with the remaining specifications. Using this set of predictors we can observe a positive relation between human capital in terms of years of schooling and experience and the initial size of the company. This relationship persists in other model specifications, but with a smaller coefficient for schooling. Both necessity and foreign entrepreneurs face important liabilities when starting a venture whilst prior entrepreneurial experience is an important determinant of entry size, particularly when measured in terms of personnel.

Results support the first hypothesis with entrepreneurial ability, defined as the wage premium commanded as wageworker, predicting larger entry size. Columns (2) and (5) explicit this relationship, with those in the upper ability quartile starting firms approximately 30% larger than those at the bottom 25% of the entrepreneurial population.

Table 7—Entry Size OLS Estimates (1994 - 2009)

	DV = ln(Initial no. Work)			DV = ln(Initial Sales Rev.)		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.918***	0.968***	0.977***	3.468***	3.556***	3.530***
Ability:						
Q2		0.013***	0.023***		0.104***	0.128***
Q3		0.074***	0.097***		0.160***	0.207***
Q4		0.276***	0.218***		0.330***	0.294***
Distance (km) × 10		-0.029***			-0.071***	
Outsider			-0.103***			-0.092***
Outsider × Ability:						
Outsider × Ability Q2			-0.031***			-0.083**
Outsider × Ability Q3			-0.065***			-0.149***
Outsider × Ability Q4			0.158***			0.078*
Schooling	0.032***	0.020***	0.020***	0.053***	0.040***	0.040***
Age	0.002***	0.002***	0.002***	0.005***	0.002**	0.002*
Prior Venture	0.304***	0.301***	0.300***	0.154***	0.150***	0.151***
Necessity	-0.125***	-0.109**	-0.120**	-0.240***	-0.235***	-0.233***
Male	0.083***	0.071***	0.072***	0.226***	0.200***	0.199***
Foreign	-0.180**	-0.184**	-0.191**	-0.146***	-0.144***	-0.145***
2-digit SIC Dummies	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Observations	207,656	207,656	207,656	207,656	207,656	207,656
Adj. R-squared	0.278	0.280	0.291	0.394	0.395	0.395

***** p<0.01, ** p<0.05, * p<0.1**

Differences in coefficients are larger for the sales revenues of the first year of activity, depicted on columns (5) and (6), but nonetheless significant for both measures of firm size. The gap registered for the upper ability quartile—it more than doubles the coefficient from the third quartile—is of particular interest, especially given that the differences in education are not very pronounced between these two quartiles, see Table 5. The aforementioned argument that relatively high-ability/low-schooling individuals self-select themselves into entrepreneurship is consistent with this finding.

Larger distances between the locations of the last establishment where the individual worked and that of the started venture reduce initial. Also, from columns (3) and (6), outsiders coming from a municipality other than the present one, or one adjacent to the present one, will open ventures that are about 10% smaller vis-à-vis those of local rivals. These results support the prediction of hypothesis 2a, which theorised that a positive impact of structural embeddedness on firm performance was explained by the familiarity of locals with their milieu. Outsiders, by contrast, have to incur into transaction and reputational costs, which puts them, at least initially, in a less advantageous position.

Hypothesis 3, relating the positive mediating impact of structural embeddedness on ability and, subsequently, on firm performance, demands a more fine-grained analysis of results. Examining the coefficients from columns (3) and (6) of Table 7 we see that, in general, outsiders start firms that are about 10% smaller than locals. The negative signal of the slopes for the interaction of the second and third quartiles with outsidership demonstrates the difference between the comparable quartiles of lower. On average, outsiders on the second and third ability quartiles start smaller firms than their

comparable local counterparts. This result is consistent with hypothesis 3, which predicted that the amplifying role of embeddedness on entrepreneurial ability.

The same cannot be said, however, of the interaction between outsidership and the fourth ability quartile. Outsiders in this group start larger firms than local entrepreneurs belonging to the same interval of the ability distribution. As was noted before, entry in an unfamiliar environment carries transactional and other costs to outsiders who need to costly acquire and convey information for market insiders. Serving as a de facto entry barrier, this liability of outsidership is expected to reduce and hamper the start of new ventures by outsiders. As a consequence, a disproportionate number of outsiders should be found amongst the high-ability ranks of entrants. This conjecture is confirmed by the distribution of ability according to local of origin of the entrepreneur depicted on Table 8. Consistent, the distribution of locals, accounting for approximately one-fifth of individuals, shows a small monotonic decrease in the weights of each quartile as ability increases. By contrast, over 35% of outsiders are in the top quartile, which can help to explain the signal of the interaction effects reported above.

Table 8—Ability/Outsider Cross-Tabulation (1994 - 2009)

Ability	Locals	Outsiders
P1 — P25	27.35%	13.65%
P26 — P50	26.43%	19.27%
P51 — P75	23.59%	30.61%
P76 — P100	22.63%	36.47%

Continuing with the analysis of new venture performance we now move the firm growth estimates. Firm growth, defined as the yearly difference in the natural logarithms of size, shares most of its individual-level determinants with firm size so results

are not expected to drastically differ from those of Table 7. As discussed in the methodological discussion of the previous chapter, the study of firm growth suffered from a survival bias. The problem was solved with the implementation of Heckman's (1979) two-step correcting procedure. The first step, transcribed on Table 9 consists of a probit model to estimate the likelihood of firm closure, the selection event.

The determinants of firm closure are evaluated at entry and are similar in signal and significance to those of the later MNP models from Table 11. The inverse Mills ratio retrieved from Table 9 is included as a regression term on the firm growth regressions as a correction for the survival bias derived from growth being conditional on the continuation of the venture. The lack of significance in this term evidences the relatively small magnitude of the bias that would be incurred should growth be measured without a correction for survival.

Table 9—Probit Self-Selection Model (1994 – 2009)

DV = Closure	**Coefs.**
Constant	-221.244***
At Entry:	
Ability	-0.173***
Distance (km) × 10	0.023**
Schooling	-0.064***
Age	-0.012***
Prior Venture	0.077***
Necessity	0.418***
Male	-0.069***
Foreign	1.204***
ln(No. worker)	-0.249**
Firm Age	YES
2-digit SIC Controls	YES
Year Controls	YES
Observations	245,580

***** p<0.01, ** p<0.05, * p<0.1**

Table 10 retains the specifications of the initial firm size models, with further controls for growth, notably the aforementioned inverse Mills ratio from the selection model, firm age, and initial size. Concerning firm age and initial size, older firms grow less than younger ones and larger organisations tend to experience milder variations in size than their smaller counterparts. Therefore, the negative relationships between both age and firm size and the rate of growth fall in line with past findings in the literature (Evans, 1987b).

The most noticeable difference between the size and the growth models lies in the signal of the coefficients for the age of the entrepreneur. Whilst relatively small in magnitude, the pattern extends to all the model specifications tested on Table 10. Other than that, outcomes validate the aforementioned remarks with firms managed by the consecutively higher ability entrepreneurs growing faster than those of their less apt counterparts. Similarities are also found in the distance coefficients, with entrepreneurs coming from distances further away suffering from lower rates of growth. In regard to the ability/embeddedness interactions, similar, although less significant, outcomes persist. In terms of turnover, the top 25% of outsider entrepreneurs grew almost 40% faster vis-à-vis locals. As in the case of initial firm size, the remaining quartiles of entrepreneurs coming from municipalities other than the current or an adjacent one, experience weaker rates of growth than locals.

Table 10—Firm Growth OLS Estimates (1994 - 2009

	DV = No. Work. Growth			DV = Sales Rev. Growth		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.097***	-0.052*	-0.053**	-4.826***	-4.030***	-4.197***
Ability:						
Q2		0.001*	0.001*		0.029**	0.052**
Q3		0.032*	0.023**		0.061*	0.097*
Q4		0.091***	0.086***		0.275***	0.151***
Distance (km) × 10		-0.026**			-0.001***	
Outsider			-0.087***			-0.041
Outsider × Ability						
Outsider × Ability Q2			-0.002			-0.089
Outsider × Ability Q3			-0.010*			-0.087*
Outsider × Ability Q4			0.144**			0.383**
Schooling	0.001***	0.001***	0.001***	0.012***	0.014***	0.014***
Age	-0.001***	-0.001***	-0.001***	-0.004***	-0.004***	-0.004***
Prior Venture	0.050***	0.049***	0.050***	0.063**	0.064**	0.063**
Necessity	-0.013**	-0.014*	-0.013*	-0.029***	-0.042***	-0.042***
Male	0.003	0.003	0.002	-0.062***	-0.067***	-0.065***
Foreign	-0.070***	-0.073***	-0.091***	-0.075*	-0.075	-0.075
ln(Size t-1)	-0.150***	-0.147***	-0.112***	-0.311***	-0.317***	-0.314***
ln(Sales Rev. t-1)	-0.011***	-0.011***	-0.013***	-0.599***	-0.592***	-0.592***
Firm Age Controls	YES	YES	YES	YES	YES	YES
2-digit SIC Controls	YES	YES	YES	YES	YES	YES
Year Controls	YES	YES	YES	YES	YES	YES
Inv. Mills Ratio	-0.105	-0.097	-0.101	-2.941	-2.332	-2.317
Observations	142,071	142,071	142,071	142,071	142,071	142,071
Wald Chi-squared	882.25	901.69	899.80	34,794.70	34,799.72	34,796.24

C. *Decision to Continue, Transfer, or Close*

Table 11 presents the estimates of the multinomial probit model for the business decisions to keep, transfer, or close a venture in a given year. Hypotheses 4 to 7 identified a number of theoretical connections between these three organisational outcomes and the explanatory variables of interest—entrepreneurial ability and structural embeddedness. The baseline category against which coefficients are compared is the continuation of the firm under the same management. The two modes of exit of the entrepreneur comprise the transfer of the control of the firm to another individual or the business closure. Results from column (1) serve the double purpose of providing a benchmark against the other specifications and a comparison term with an earlier model used by Holmes and Schmitz (1996) in a similar evaluation of the determinants of managerial turnover. Regarding this manner, it should be emphasised that differences exist between the MNP methodology of Table 11 and the multinomial logit chosen by the authors. The Methodology section offers a description of the superior inference qualities of the MNP in comparison to other unordered multi-response models.

The estimation results from column (1) of Table 11 show the years of schooling of the entrepreneur have a negative impact on the likelihood of discontinuation and a non-significant positive impact on the probability of business transfer. This result holds for the remaining tested specifications. Measures of formal education such as years of schooling measure human capital aspects that are not acquired via work nor obtained from previous entrepreneurial experience and were included to serve as alternative proxies for ability.

Table 11—Multinomial Probit Estimates (1994 - 2009)

Baseline = Continue	(1)		(2)		(3)	
	Closure	Transfer	Closure	Transfer	Closure	Transfer
Constant	-332.923***	32.931***	-312.410***	25.201***	-312.581***	25.099***
Ability						
Q2			-0.057***	0.080***	-0.051***	0.046**
Q3			-0.046***	0.092***	-0.028**	0.069*
Q4			0.078*	0.124***	0.080**	0.095**
Distance (km) × 10			0.083***	-0.02***		
Outsider					0.503***	-0.384**
Outsider × Ability						
Outsider × Ability Q2					0.020	-0.047
Outsider × Ability Q3					0.050**	-0.182***
Outsider × Ability Q4					0.065	-0.219
Schooling	-0.044***	0.005	-0.009***	4.84e-05	-0.008***	0.002
Age	-0.008***	-0.003*	-0.005**	0.003**	-0.002	0.002*
Prior Venture	0.096***	0.033*	0.064***	0.032*	0.079***	0.044*
Necessity	0.145***	-0.391*	0.174***	-0.207***	0.130***	-0.142***
Male	0.061***	0.065**	-0.106***	0.0593**	-0.093***	0.047**
Foreign	2.109***	1.424***	1.871***	1.279***	1.991***	1.341***
ln(Workers)	-0.053***	0.042***	-0.059***	0.048***	-0.058***	0.051***
ln(Sales Rev.)	-0.094***	0.061***	-0.103***	0.068***	-0.110***	0.072***
Firm Age Controls	YES	YES	YES	YES	YES	YES
2-digit SIC Controls	YES	YES	YES	YES	YES	YES
Year Controls	YES	YES	YES	YES	YES	YES
Observations	207,656	207,656	207,656	207,656	207,656	207,656

*** p<0.01, ** p<0.05, * p<0.1

The negative impact of the variable on the likelihood of discontinuation can thus be understood as a human capital effect with firms controlled by more educated entrepreneurs being of better quality and thus less likely to fail. Also, and albeit lacking the power to perform statistical inference, a positive impact of schooling on the probability of transfer is consistent with both a business quality perspective and an opportunity cost explanation.

The coefficients for the age of the entrepreneur are negative for the likelihoods of closure and transfer, a result similar to the previous findings of Holmes and Schmitz (1996). The signal and magnitude of the impact of age on the probability of closure depends on the different phenomena captured by this variable. In labour economics literature, age often serves as a proxy for general work experience. For firm owners, age can also encapsulate an aspect of the financing constraints that younger, less wealthy entrepreneurs need to overcome. Finally, the probability of business closure, but also of business transfer, tends to surge as individuals age and become increasingly likely to retire from the workforce. Whilst the latter effect does not seem to carry much weight in for the closure coefficients, results on columns (2) and (3) are consistent with a retirement explanation.

Entrepreneurs with prior experience in self-employment are more prone to close and, although to a lesser extent, to transfer a business, a result that hints at the proposition forwarded by hypothesis 8, connecting ability and specialisation into entrepreneurship. Albeit in a different context, and with one more alternative—business transfer—this result contrasts with the findings of Dahl and Reichstein (2007) on Danish data. Likewise, firms started by necessity entrepreneurs also face greater odds of failure whilst, being less likely to be transferred. The scale of the negative transfer coefficient

demonstrate that, for necessity entrepreneurs, the occupational choice for self-employment is more of a last resort rather than one amongst a wide set of alternatives.

Entrepreneurial ability is a strong predictor of business transfers with the odds of transfer becoming gradually larger as the ability distribution moves to the right. Evaluating each of the other independent variables at its mean, the predicted probability of transfer for a firm managed by an entrepreneur in the fourth quartile is of 20.5%, which compares to a probability of 9.3% for entrepreneurs in the third quartile. Probabilities of closure show a more complex pattern with U-shaped pattern describing the coefficients. In other words, outcomes show that closure is more likely for the least and for the most apt entrepreneurs, albeit for distinct theoretical reasons. The fact that those at the bottom of the ability distribution are more likely to fail is unsurprising, as the performance of firms created and managed by this group is known from Table 7 and Table 10 to be subpar. For entrepreneurs in the upper quartile of the ability distribution, which control better performing ventures, the explanation differs. If, on the one hand, higher ability leads to superior business quality, on the other hand, higher ability also means more plentiful and better concurring alternatives. An entrepreneur contemplating an apparently superior alternative in self- or paid-employment will first attempt to sell her current venture, but ultimately be willing to discontinue it altogether. In this case the cause of closure is the high opportunity cost rather than the poor performance of the venture. That is to say that the business fundamentals are solid enough to guarantee its continuation but not attractive enough to generate demand. Should the returns from the continuation be insufficient to compensate the expected returns from the best alternative, then closure becomes the likely fate. In short, model outcomes are consistent with the predictions contained in hypotheses 4 and 5b.

A greater distance from past jobs contributes to the probability of business failure whilst reducing the chances of a transfer occurring. Kilometre distances serve as a proxy for embeddedness with individuals starting a business farther away from their past location being less familiar with a given environment than locals are. Hypotheses 6 and 7 tested for the effects of embeddedness on the probabilities of transfer and closure, respectively. The findings suggest that it is more difficult for outsiders to find buyers for their businesses and more likely for those businesses to fail, even when the quality of the businesses is high, as depicted in the interaction results from column (3) of Table 11.

D. *Entrepreneurial Specialisation*

Entrepreneurial specialisation concerns activities pursued by entrepreneurs after the leaving of a venture and is evaluated in two forms. First, through an exploratory analysis of the occupations engaged upon after departure from a firm. Second, via an empirical MNP model that observes the destinations in terms of occupations of those who left their first venture via transfer or closure. The goal of the analysis is the testing of hypothesis 8, which relates the individual ability with behaviours reflecting specialisation into entrepreneurial activities.

Table 12 tabulates the occupations of individuals in the after year after, or the second year after for the cases in which the first year is missing, departing from their prior entrepreneurial venture. An overall look at the tabulation shows that a larger portion of entrepreneurs who return to self-employment do so after transferring, instead of closing, their previous venture. Also, there is a higher portion of missing values after two years for closure than for transfer, which can be associated to a possible retirement

from the workforce after closing the firm. This is particularly visible when looking at missing individuals who were at least 65 when leaving.

Table 12—Cross-Tabulation of Occupation After Departure (1994 — 2009)

New occupation	Transfer	Closure
Entrepreneur	60.89%	60.91%
New Firm	*50.35%*	*13.95%*
Existing Firm	*10.54%*	*46.96%*
Paid-Worker	36.14%	31.24%
Missing	2.97%	7.85%
(Age > 64)	*2.35%*	*3.92%*
Observations	2,715	17,964

The portion of former entrepreneurs remaining in self-employment after transferring or discontinuing a business is virtually identical. Still, a decomposition of this category into whether the managed entrepreneurial firm was founded by the individual or was already in place when the entrepreneur took control reveals a sharp distinction between the two groups. Over 50% of individuals who remained in entrepreneurship after transferring their last business started a new firm, which compares to about 14% of those who exited by discontinuation. This difference is consistent with the idea that specialisation into firm creation and development for subsequent transfer is favoured by those with higher levels of ability, whilst the management of existing firms is left for lesser apt entrepreneurs (Holmes and Schmitz, 1990).

Further evidence of the specialisation into serial entrepreneurship is present on Table 13. The model estimates the likelihoods of three different choices of occupation for those who left a previously controlled venture conditional on a number of individual-level characteristics, notably entrepreneurial ability. As mentioned in the Methodology section, the alternatives include the return to paid-employment, which is the baseline

category, the founding of a new firm, and the management of an already existing organisation. Over 90% of those who left their venture were identified in the subsequent 5 years and thus were included in the estimation of the model.

The results from column (2) of Table 13 demonstrate a positive relationship between ability and entrepreneurial re-entry via the founding of a new venture. Entrepreneurs in the highest ability quartile are the most likely to follow the path of serial entrepreneurship, whilst those in the second quartile also have a similar probability of doing so. Results for the third quartile, albeit positive and statistically significant, are of a smaller magnitude. When compared to the second and fourth ability quartiles, the odds of these individuals starting another venture are somewhat mitigated by the likelihood of the baseline alternative, that is, returning to the paid-labour market.

By contrast, the probability of reappearing as the manager of a previously existing firm are only distinct to those of returning to paid-employment for the upper ability quartile. Results for all other quartiles are not significantly different from those of the baseline. This shows that, although the ownership and management of an already existing firm may be seen as a form of entrepreneurial activity, those using this re-entering choice are closer in terms of ability to paid-workers than to entrepreneurs who return by founding a new venture. Theoretically, the result can be explained by the predictions of hypothesis 8, as individuals with higher endowments of ability benefit from a specialisation into serial entrepreneurship. This occurs because the demand for businesses is dependent on its intrinsic quality. As shown on the results regarding hypothesis 1, ability is a predictor of business quality, so it follows that a greater of ability should lead to an increased likelihood of starting another venture after the transfer of the previous one.

Table 13—Multinomial Probit Re-Entry Estimates (1994 — 2009)

	(1)		(2)		(3)	
Baseline = Paid-Employment	New Firm	Existing Firm	New Firm	Existing Firm	New Firm	Existing Firm
Constant	102.144	-65.921	124.391	-60.507	138.877	-58.956
Ability:						
Q2			0.234***	-0.034		
Q3			0.147*	0.018		
Q4			0.262***	0.056*		
Ability (Linear)					0.217***	0.053**
Prior Exit by Transfer	1.793***	1.219***	0.935***	0.661**	1.293***	0.735**
Transfer × Ability:						
Transfer × Ability Q2			-0.273	0.037		
Transfer × Ability Q3			0.085	0.004		
Transfer × Ability Q4			0.208**	0.026		
Transfer× Ability (Linear)					0.148**	0.042
Schooling	-0.029	0.138*	-0.021**	0.073	-0.010*	0.038*
Age	-0.108***	0.264**	-0.115*	-0.210*	-0.139***	-0.174
Male	0.073	0.093**	0.049	0.042**	0.054	0.041**
Foreign	0.113**	-0.253***	0.115**	-0.263***	0.144**	-0.293***
Years after exit Controls		YES		YES		YES
2-digit SIC Controls		YES		YES		YES
Observations		18,938		18,938		18,938

***** p<0.01, ** p<0.05, * p<0.1**

As evidenced in the descriptive analysis of Table 12, the mode of exit from the previous venture matters for the occupational choice in re-entry. Prior exit by transfer—in contrast to exit by closure—increases the chances of re-entry in entrepreneurship when compared to the paid-employment alternative. Still, the size of the effects is highly dependent on the mode of return, with the transfer of an anterior venture having a greater impact on the likelihood of founding a new firm than it does on the probability of managing an existing business. This result can be explained with the entrepreneurial specialisation notion, according to which, entrepreneurs transfer existing firms in order to start new ones that allow them the pursuit of previously unavailable opportunities. By contrast, exit by business discontinuation, the omitted category, is significantly different from the two categories of re-entry via the entrepreneurship route. A possible justification may be related to an opportunity cost explanation, with entrepreneurs discontinuing their business in order to return to a better-paying job as an employee.

The coefficients for the years of schooling should be interpreted under the light of the results obtained for entrepreneurial ability. More formal education reduces the chances of re-entering by start-up whilst only having a small, marginally significant, impact on the odds of running an established firm. This sharply contrasts with the results for the entrepreneurial ability dummies, which increase the odds of returning to self-employment as a founder of a new firm. A possible explanation for this observation is linked with the signalling effect of formal education in paid-employment (Spence, 1973). If firms use schooling as a criterion for assessing human capital, then more educated entrepreneurs will have an advantage over otherwise similar peers when applying for jobs after leaving self-employment. Formal education constitutes a particularly valuable source of information regarding the quality of the human capital when information

asymmetries regarding the fate of the previously managed business exist. By contrast, this information, and the signalling associated to schooling is of no value for an individual who returns to self-employment. Within this subgroup, a fewer proportion of individuals graduated from college and from high school, as demonstrated on the disaggregation provided on Table 14. The almost negligible difference in the college degree category between those re-entering into an existing firm and the individuals returning to paid-employment further confirms the schooling coefficients from Table 13.

Table 14—Cross-Tabulation of Schooling/Mode of Re-Entry (1994 — 2009)

	New Firm	Existing Firm	Paid-Worker	Total
Primary	20.38%	14.06%	16.45%	16.96%
Middle School	34.61%	31.73%	26.15%	30.83%
High School	29.17%	31.72%	34.47%	31.79%
College	15.84%	22.49%	22.93%	20.42%

Older entrepreneurs are less likely to start another company after leaving the previous one. The coefficient for age is likely to carry a retirement effect, as the creation of a new firm is a lengthier process than the acceptance of a paid-employment job in an existing firm. Foreigners, however, are more likely to open than to revert to a worker status but more likely to do so than to end up running an existing firm.

VII. Conclusions

A. *Discussion*

The central theme of the present dissertation was that employment experiences taking place prior to entrepreneurship play a determinant part in the prediction of individual and venture outcomes in self-employment. Using a set of statistical models to data on more than 36,000 Portuguese start-ups over the 1994 – 2009 period I found that factors such as worker productivity and the prior embeddedness in an environment had a lasting impact on later actions ranging from occupational choice to keep or transfer decisions. What is more, the two factors influence each other with embeddedness serving as a catalyst for the ability of the entrepreneur.

Specifically, entrepreneurial ability, defined as the individual fixed-effect of work wages earned prior to entry in self-employment, predicted entry size and growth with ventures founded by entrepreneurs with higher levels of ability being larger at entry and growing at a faster pace than those started under comparable conditions by otherwise similar individuals. In addition to this, entrepreneurial ability had an incremental impact on the probability of firm closure and an also positive, yet greater in magnitude, effect on the likelihood of business transfer. This seemingly paradoxical result—entrepreneurial ability causes firms to perform better but also to experience shorter longevities—was attributed to an opportunity cost effect. Ability, being constructed from a wage equation, also accounts for the opportunity cost of the individual. Consequently, entrepreneurs with greater levels of ability benefit from improved prospects concerning employment alternatives and thus were more likely to abandon a venture by discontinuance, but especially via transfer. Whilst the former mode of exit may motivated by the relatively low earnings of self-employment compared to the equivalent paid-labour

wages (Hamilton, 2000), the latter is consistent with a cash-out approach (Arora and Nandkumar, 2011) according to which more apt entrepreneurs who create better performing businesses have improved prospects of finding a buyer to take over the venture.

Occupational choice observed after departure from a start-up is also conditional on individual ability. A statistically significant, monotonic, relationship between entrepreneurial ability categories and the likelihood of re-entry in entrepreneurship via the founding of a new firm was found to hold. When compared to those who revert back from entrepreneurship to paid-employment, or those who, whilst remaining entrepreneurs, turn into owner-managers of existing ventures, serial entrepreneurs were more likely to have transferred, rather than discontinued their previous venture. This is consistent with a division of labour hypothesis theorised by Holmes and Schmitz (1990), in which the highest ability entrepreneurs specialise in the creation and development of businesses and thus becoming serial entrepreneurs.

Structural Embeddedness, measured as the physical distance between the locations where an individual worked and that where he subsequently starts a firm, produced an impact on the initial size and growth rates of entrepreneurial ventures, whilst also mediating the effect of ability on performance. Longer distances translated into a more significant liability for the outsider entrepreneur and firms created by this group were smaller and lagged in growth vis-à-vis their local counterparts. Past research discussing the implications on performance of the reputational (Granovetter, 1985) and transaction (Uzzi, 1999) costs aspects for unembedded actors further substantiates these findings.

More generally, the embeddedness/performance interplay may be interpreted under the light of a risk/reward analysis. On the one hand, unembedded entrants lack

familiarity and hence social ties with other actors in a network (Granovetter, 1973). This may explain why outsiders were more likely to close and less likely to transfer a venture. On the other hand, moving into a new location constitutes a de facto strategic commitment, and can improve business prospects by expanding the potential customer base—particularly when moving to larger urban areas—and by introducing an innovation capable of generating a competitive advantage over rivals (Uzzi, 1997). Evidence of the latter of the two effects was presented in the firm performance models, specifically in the positive sign of the interaction between outsidership and the highest ability quartile. Yet, for the remaining ability quartiles, the sign of this interaction was negative, a result theoretically predicted in hypothesis 3. Embeddedness mediates the effect of individual ability by providing a network of ties within which entrepreneurs can act. The absence of such ties constrains the way economic actors navigate and map the existing opportunity landscape, thus imposing a de facto liability upon outsiders.

B. *Limitations and Paths for Future Research*

The implementation of a novel measure of individual ability shed some light on a number of entrepreneurial phenomena ranging from the performance of new ventures to the specialisation into serial entrepreneurship. Still, the present analysis may be complemented in some aspects. The employed definition of entrepreneurial ability implied that all wage earners—and not only those who become entrepreneurs—were included in the estimation. An interesting property of the specification is that it permits the comparison of the abilities of those who eventually became entrepreneurs and those who remained in paid-employment. Previously conducted research observed that lower-paid wage workers, who have changed jobs more times than those with comparable attributes, are

more prone to enter self-employment (Evans and Leighton 1989), and that entrepreneurs may have a distaste for following orders, for which they suffer a cut in their income (Hamilton 2000). A recent body of work examining the employee mobility to entrepreneurship (Åstebro, Chen and Thompson, 2011) found that a disproportionate number of entrepreneurs had either very high or very low incomes compared to the general population and proposed that entrepreneurs were drawn from the tails of the ability distribution. Findings by Carnahan et. al. (2012) regarding employee mobility to entrepreneurship suggested that those with higher earnings are less likely to leave firms but when doing so, more prone to create new ventures. The transposal of the measure of ability developed here to the study of individual mobility to entrepreneurship can further contribute to the profiling of entrepreneurs as employees and improve our knowledge of what determines the occupational choice and the outcomes of self-employment. Furthermore, the clear link found between prior worker productivity and start-up performance may have implications to researchers working in the field of spin-offs and entrepreneurial orientation of established firms. Estimates of people engaging in entrepreneurial behaviours range from 20% (Reynolds et al., 2005) to over 50% of the population (Aldrich and Zimmer, 1986), making the question of how this orientation may be groomed inside organisations an especially relevant one. In this sense, the follow-up of not only the departing employees, but also of the remaining parent companies could provide an interest path for future work.

Finally, the present work did not purse the exploration of the fate of transferred firms. The comparison with continuing firm is of particular interest, namely with firms founded by entrepreneurs of equivalent ability, with findings possibly shedding some light on the consequences of the division of labour in entrepreneurship (Rosen, 1983).

C. *Final Remarks*

In these final remarks I would like to momentarily return to the tales of Odysseus and the analogy used in the introductory chapter. In what was perhaps the most notable demonstration of his mētis, or cunning ability, Odysseus deceives the Cyclops Polyphemus by concealing his identity and claiming his name to be *Οὖτις,* or "Nobody". The hero then proceeds to blind and escape from Polyphemus whom in agony screams that "Nobody" is hurting him. Upon hearing such plead, the other Cyclopes think Polyphemus is alone and being punished by the Gods, thus deciding to abandon him to his fate whilst involuntarily offering Odysseus a chance to escape the island.

The notions of identity and reputation, but also of ability and embeddedness were of central importance in the present thesis. As for the hero Odysseus, the ability to quickly identify opportunities constitutes a valuable asset for entrepreneurs. The notion of identity and of its persistent nature also plays a role in the analysis, with the differentials in wages paid by employers being reflected in the later activities developed as entrepreneurs. Findings concerning the repeated starting of new ventures over time are also revealing of an identity of those who specialise into serial entrepreneurial.

I will conclude with one last note also drawn from the episode of Odysseus and the Cyclops. Upon arriving at the island of Cyclopes, modern day Sicily, Odysseus and his men discovered and feasted upon the provisions of the absent Polyphemus. They acted that way not with ill intentions but rather because it was in accordance with their native customs of hospitality. Unsurprisingly, the Cyclops thought otherwise and started eating Odysseus' men as retribution. As it appeared, the lack of embeddedness was taking its toll on this otherwise seasoned explorers. The exception of course, was Odys-

seus, whom by virtue of his superior ability managed to deceive Polyphemus and escape the island. In the end, outsidership may be a liability for most, but not for the fittest.

D. *Acknowledgements*

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